CAHNERS PUBLICATION

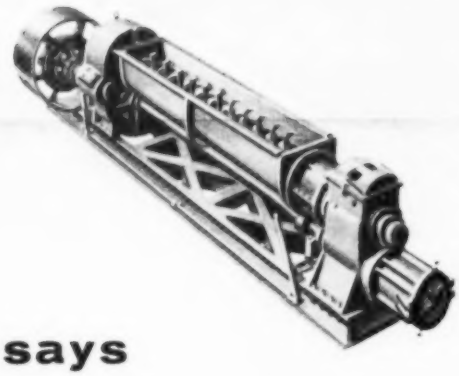
Brick & Clay RECORD

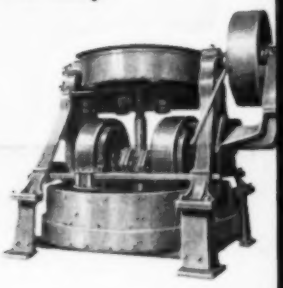
ANUARY, 1960

ANNUAL REFRACTORIES ISSUE

with Executives' Comments on the 60's

"Wonderful Workhorses,"





PLANT MANAGER M. P. HALL CHECKS THE BONNOT "ABSOLUTE GAUGE" (CONTROL) WHICH HE FINDS EXTREMELY VALUABLE IN PRODUCING THE QUALITY-TEXTURED RED BRICK FOR WHICH ALTON'S MARYLAND HEIGHTS PLANT IS FAVORABLY KNOWN.

PRODUCTION MANAGER TED SCHUTTENBERG (LEFT) JOINS PLANT MANAGER HALL AFTER A "QUICK CHANGE" FROM STANDARD TO NORMAN DIE ON "THE BONNOT WORKHORSE."

DRY PAN OR EXTRUDER, BONNOT MACHINES GET AN "AROUND THE CLOCK VOTE OF CONFIDENCE" FROM ASST. SUPERINTENDENT RUSS RICHARDSON, WHO REPORTS BONNOT EQUIPMENT "EASIEST TO HANDLE" IN HIS MANY YEARS OF CLAY-PROCESSING EXPERIENCE.

says

ALTON BRICK

- management
- production
- maintenance

in reporting on BONNO units at Maryland Heights Pla

—PRODUCTION OF MORE THAN 50,000,000 BRICK WITHOUT ANY DOW TIME EXCEPT FOR REPLACEMENT OF NORMALLY WEARING PARTS.

—GRINDING OF NEARLY 2,000,000 TONS OF SHALE AND STILL GOING STRON

These are two big reasons behind the title of "wonderful workhorses" bestowed on a Bonn Greyhound Extruder and a Bonnot 10-foot Dry Pan by the management-production-maintenan supervisors at the Maryland Heights Plant of the Alton Brick Company in St. Louis, Mo.

Experience with the Bonnot Dry Pan covers 20 years—over 5 with the Bonnot Extruder. addition to profitable dependability for maintaining rugged production schedules, the Bonn Greyhound is completely satisfactory with either steam or oil dies—for all sizes of bric With the Bonnot Greyhound, Alton shale is processed more accurately because it's practic to hold a higher vacuum . . . operating efficiency is increased because of easy accessibili of "wearing parts."

Bonnot engineers and machines will provide the same manufacturing economies for your plant. At Bonnot, your problems will get prompt attention, with the accuracy of the answers based on know-how gained by more than 70 years of service to leading clay processors throughout the U. S. A. Call, wire or write today . . . for greater profits during "the Soaring 60's"!

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REPRESSES
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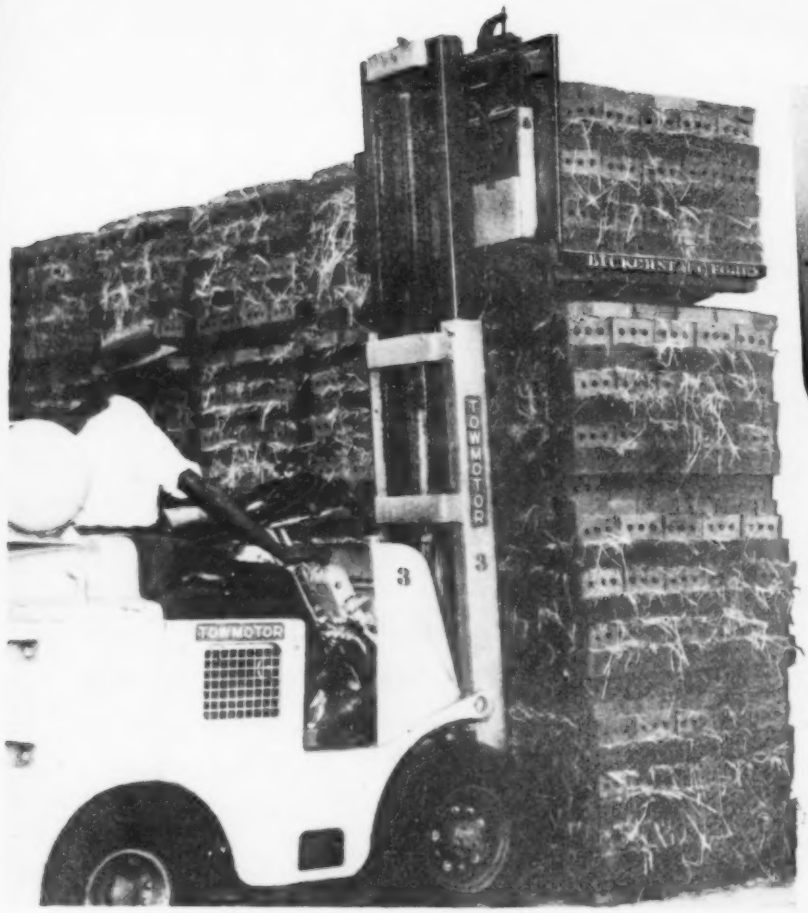
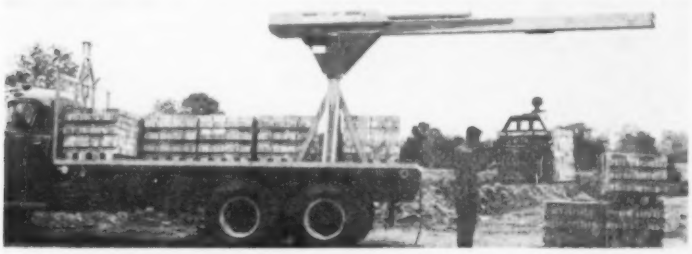


UP

Brick Handling Profits in 1960

Bickerstaff Forks are known as the "do-it-all" for brick handling. Moves brick in and out of kilns; in and out of inventory. Loads directly to freight car or truck. Bickerstaff Forks reduce labor cost. Increases kiln turnover. Eliminates pallets and strapping. Assures you a smoother brick handling operation at a lower cost per load.



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You can actually make twice as many loads per day with a Bickerstaff Crane Fork—Swinging from a boom-type unloader. Puts the package where you want it. Grips firmly, no slipping... no chipping.

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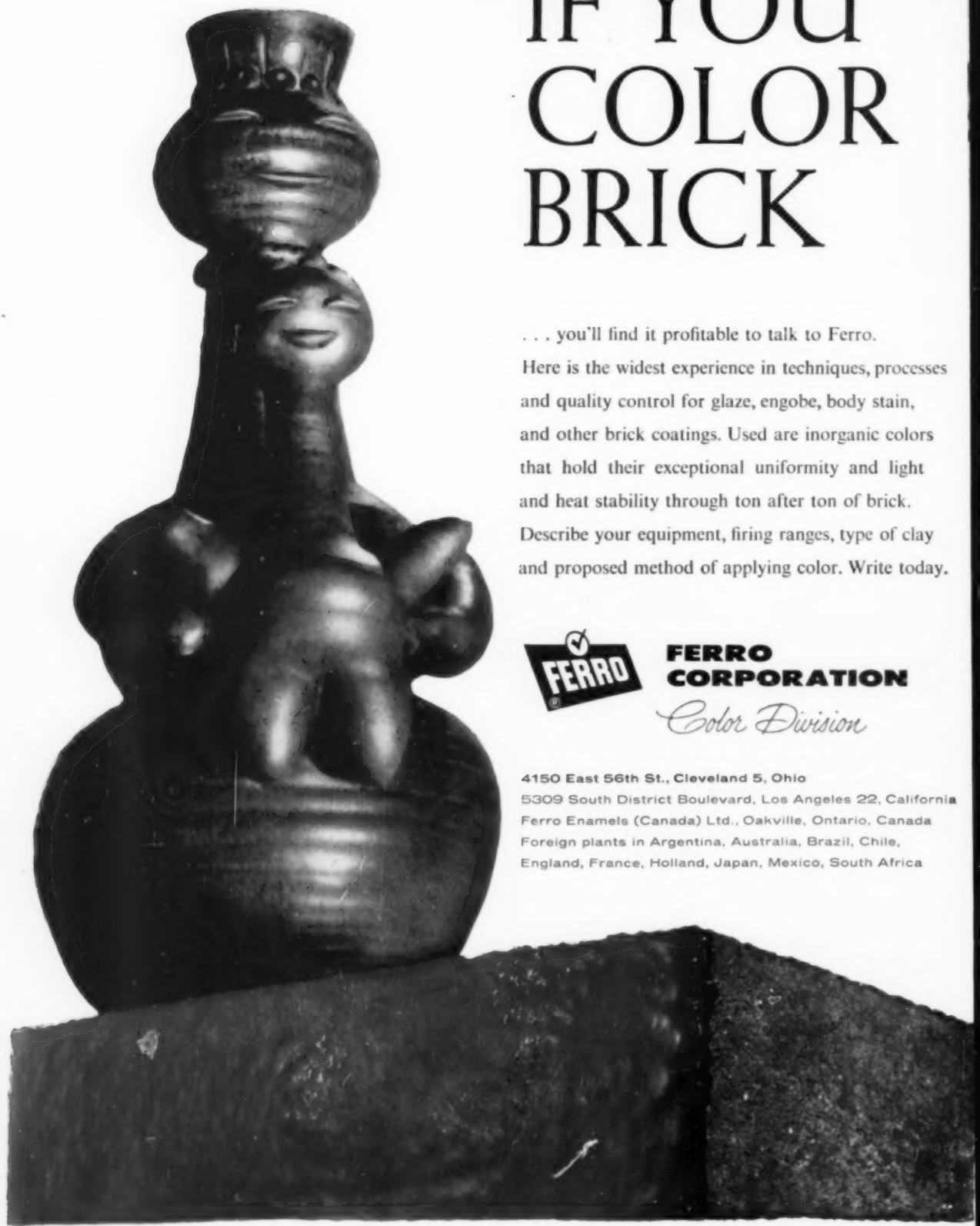

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. . . you'll find it profitable to talk to Ferro. Here is the widest experience in techniques, processes and quality control for glaze, engobe, body stain, and other brick coatings. Used are inorganic colors that hold their exceptional uniformity and light and heat stability through ton after ton of brick. Describe your equipment, firing ranges, type of clay and proposed method of applying color. Write today.

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LEADING CLAY JOURNAL OF THE WORLD

Brick & Clay RECORD

A CAHNERS PUBLICATION

January, 1960 Vol. 135, No. 7

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now in 67th year.

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Features

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The cover this month depicts the tapping of molten iron from a blast furnace at the Jones & Laughlin Aliquippa, Pa. works. This is the first four-color photograph ever reproduced on a Brick and Clay Record cover. We wish to thank Jones & Laughlin Steel Co. and particularly J. H. Gardner for the use of this picture in conjunction with our annual Refractories issue.

THE MAGAZINE OF

Brick—Drain Tile—Structural Tile—

Clay Aggregate—Terra Cotta—Roofing Tile

Refractories—Clay Pipe

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Refractory grades of "PYRAX" pyrophyllite can be used to good advantage in refractory brick, refractory cements, unfired refractories, backwalls, radiants, tile setters, saggers, and other special refractories.

"PYRAX" pyrophyllite has a P.C.E. of cone 26 to 27 and where mixed with small amounts of kyanite its P.C.E. can be increased to cone 28 or 29.

"PYRAX" pyrophyllite refractories when properly compounded have a high strength, will not spall or fail due to temperature gradient.

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For 1960 Style Operating Efficiency

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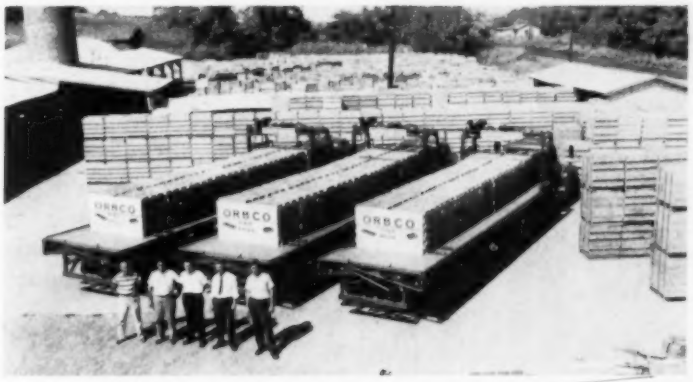

THREE OF TEN SUPERLITE UNLOADERS serving Owensboro (Ky.) Brick & Tile Co. Operated by Spencer Equipment Co., Rockford, Ind., under the direction of Bud Horstman. Superlites have been on the job at Owensboro Brick since September 1956.

"The Proof is in the trying!"

- **Save Time and Labor**
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Add up to 50% to the life of your knives, augurs, dies and liners with the effective body lubrication you get with the use of Additive-A clay conditioner. Additive-A makes clay easier to extrude, lets you use less power, cuts down time and maintenance costs.

Other important advantages of using Additive-A clay conditioner are: Increases green plastic strength • Permits reduction of tempering water • Cuts dryer loss • Reduces laminations • Improves workability of clay • Increases dry green strength • Permits more even temper • Effectively controls scumming • Upgrades quality of all ware.

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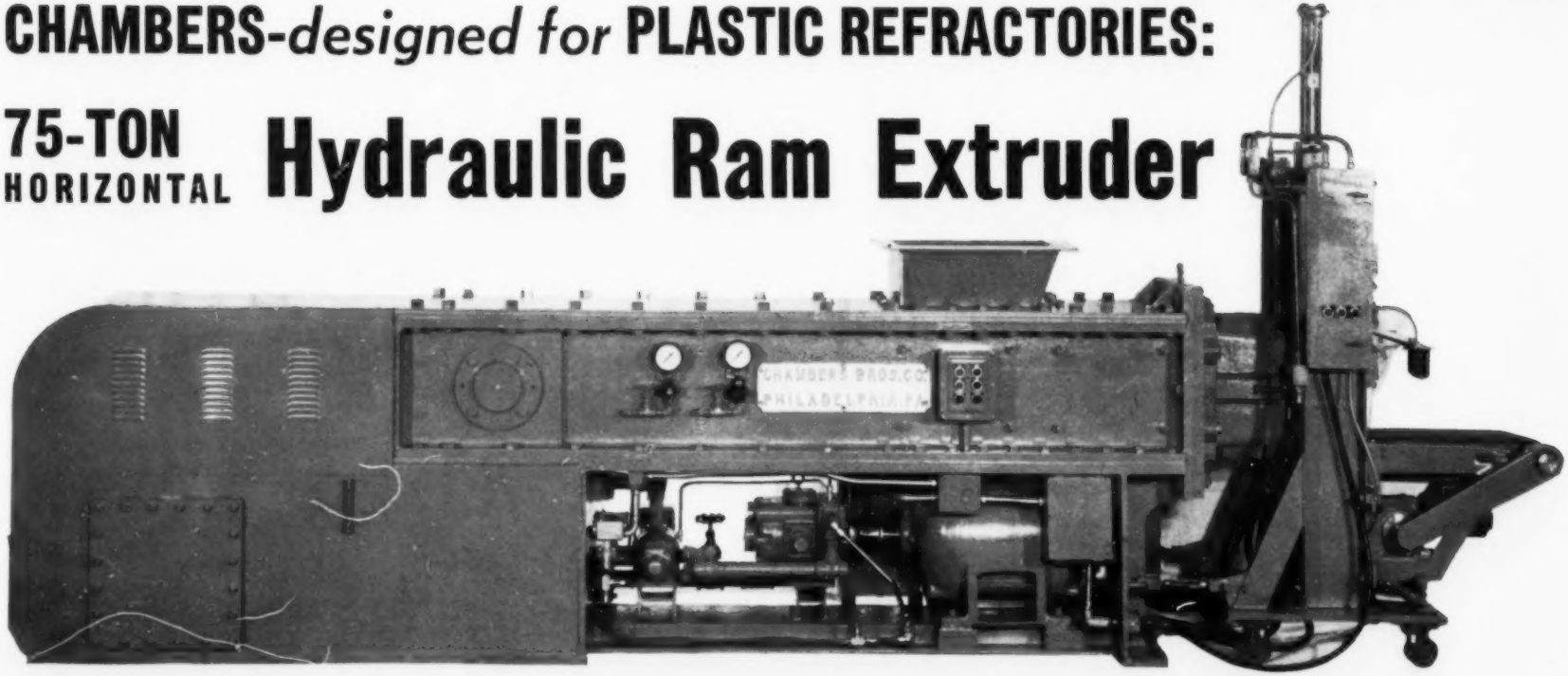
75-TON HORIZONTAL Hydraulic Ram Extruder



Extruder

Capacity: 4 to 6 100-lb. blocks per minute. Extrusion chamber 12" wide, 15" high, lined with ground Ni-Hard wearing plates. Oil-lubricated Ni-Hard die with horizontal wire splitters. 30 HP self-contained hydraulic system with automatic controls for continuous or manual operation.

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Hydraulic quillotine cutter is coupled to the Extruder for electric and hydraulic power. Cut lengths are measured by an adjustable electric eye. Short power-driven conveyor is built into cutter for delivery of clots to packaging conveyor.

Write or call for further details, without obligation.

When arranged for continuuos feed with vacuum case, a modified design will deliver de-aired end products.

over-all DIMENSIONS:

17' long, 3' wide
Approx. weight, 14,000 lbs.

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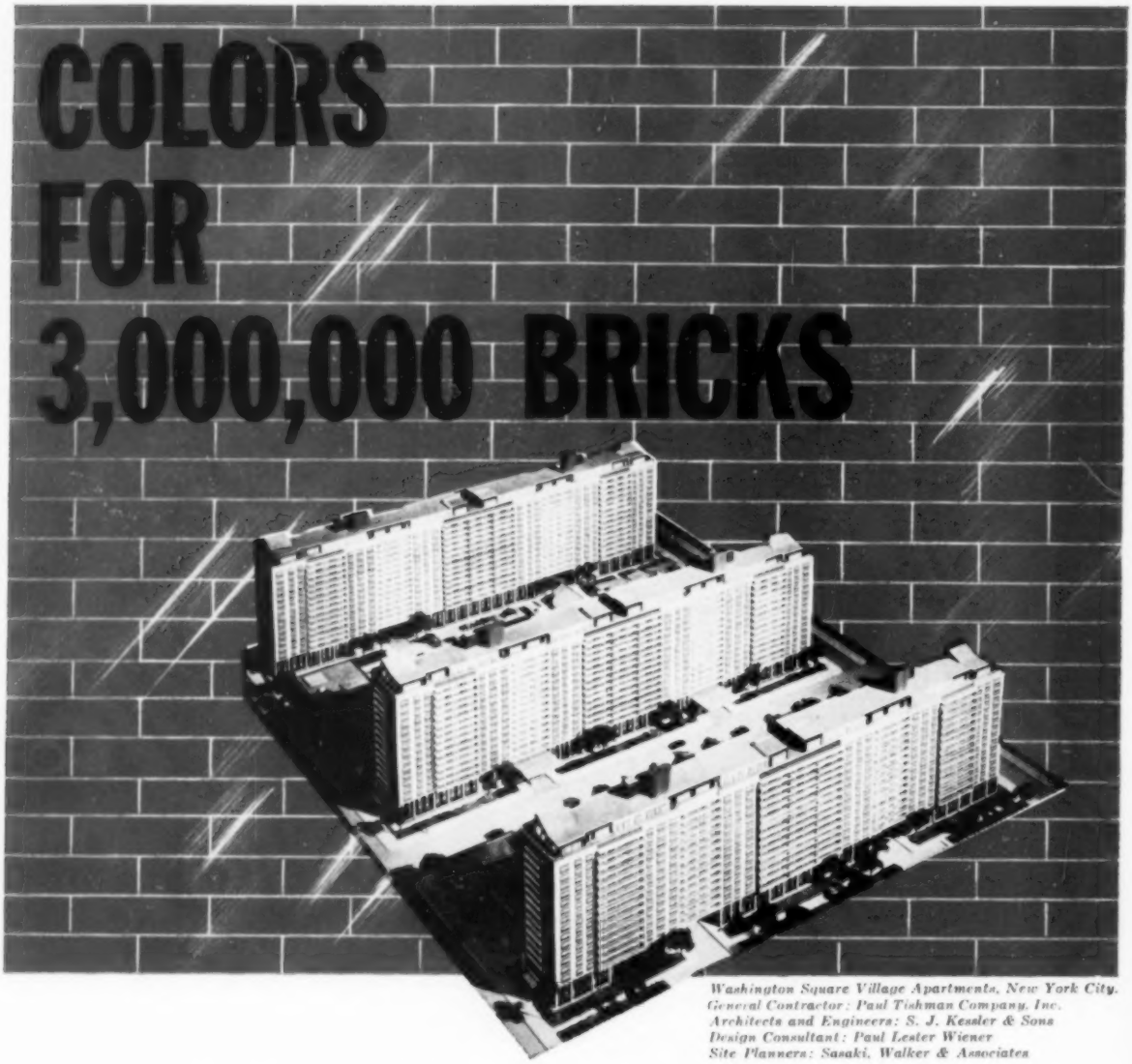
COLORS FOR 3,000,000 BRICKS



Washington Square Village Apartments, New York City.
General Contractor: Paul Tishman Company, Inc.
Architects and Engineers: S. J. Kessler & Sons
Design Consultant: Paul Lester Wiener
Site Planners: Sasaki, Walker & Associates

at New York's New Washington Square Village Apartments

Mr. Paul Tishman, builder in charge of design and construction for the development, refers to the 3 million glazed bricks in this multi-million dollar apartment project at New York City's Washington Square as "3 million pieces of fine pottery"— a worthy tribute to the manufacturer, the Binghamton Brick Company, Binghamton, N. Y.

The reds, yellows, and blues used in coloring the bricks for the bright facades of these buildings were manufactured by Drakenfeld. Research at Drakenfeld makes it now possible to offer coloring materials to suit almost any brick processing set up, and coloring methods which all brick manufacturers can use. Sand colors, engobe stains, glaze stains, colored specks, and prepared glazes are available in a wide variety of colors. To help meet unusual requirements Drakenfeld research is at your service to provide a prompt, dependable solution to your brick coloring problem. Results: beautiful, vivid colors that best meet architects' demands for color in today's building construction.

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How American Brake Shoe Maximates Production

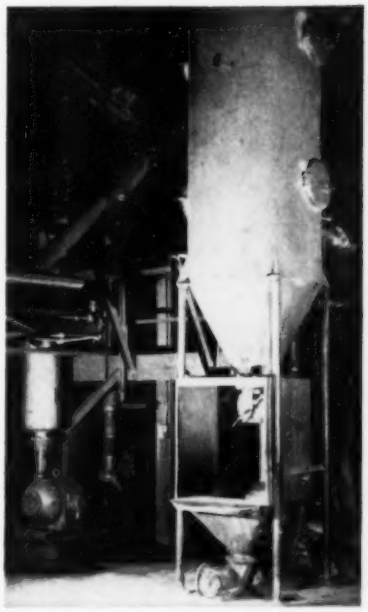
When the American Brake Shoe Company began an extensive modernization program at its New Castle, Delaware plant, one of the first steps management took to maximate production—that is achieve maximum output at less cost—was to install a Hoffman pneumatic conveying system for keeping bentonite, dextrin, silica flour and other materials *on the flow.* With a Hoffman exhauster furnishing the air as well as suction for the handling system, and use of components described here, the equipment not only simplified bulk conveying chores but paid its way in a few months by providing substantial production, material and labor savings.

MATERIAL INTAKE VALVE

Materials are introduced into the air stream through a unique nonclogging intake valve attached to the bottom of a hopper and flow smoothly through pipe lines to any one of six primary cyclone storage tanks more than 350′ distant. Hoffman intake valves insure the uninterrupted flow of dry, powdery or granular materials through all types of vacuum conveying systems. Suitable for use with 2″ through 6″ pipelines, they are equipped with standard 8″ flanges and can be easily attached to bins, hoppers, or dust collectors. Connected equipment is protected from exposure to the full suction of the system by a separate air inlet. The material handling rate can be adjusted while air is flowing. Thorough mixing insures smooth transit.

HINGE VALVE

Self-cleaning Hoffman hinge-type discharge valves are designed for air-tight closure against a head of material. The one-piece valve body is cast of gray iron with its rubber-faced disc and seat completely inside



A portion of the Hoffco-Veyor system installed at the American Brake Shoe Co. plant in New Castle, Delaware.

the casing. Lever linkage permits operation by means of chain or cable from a remote station. Provision can also be made for air or hydraulic cylinder actuation of the valve.

ROTARY VALVE

Chain driven rotary discharge valves of cast semi-steel construction feed the material in controlled quantities. Designed for interchangeability of various types of fabricated and cast rotors, valves are equipped with torque limiting drive sprockets for protection against jamming and overloading. Equalizing connections permit attachment of bleed lines to vacuum or pressure source. Inspection of the interior can be made through an access port without disassembly of the valve.

PERISTALTIC VALVE

Controlled expansion and contraction of rubber diaphragms permit discharge in measured quantities. Since there are no internal moving parts, even coarse abrasives can be handled with minimum wear. Sheet rubber diaphragms are easily replaced whenever necessary.

COMPETITIVE ADVANTAGES

In handling quantities of dry, free-flowing powdery and granular materials such as sand, shot, chemicals, etc., Hoffco-veyor systems and components speed production—provide many genuine benefits and advantages which are reflected in higher profit margins. These include:

- flexibility
- cleanliness
- time saving
- lower initial cost
- easy installation
- material saving
- labor saving
- pay for themselves

FREE ENGINEERING SERVICE

If you have a materials handling problem, you can solve it with either a complete Hoffman system or any of its parts which may be purchased separately to fit your needs. Available equipment includes dependable centrifugal blowers/exhausters, cyclones, collectors, material intake, hinge, rotary, butterfly and peristaltic valves as well as filter bag collectors. We'll be glad to make a free engineering survey to determine how you can improve your manufacturing methods by maximating production with a really tight method of material handling. Send now for a free descriptive booklet. Please write:

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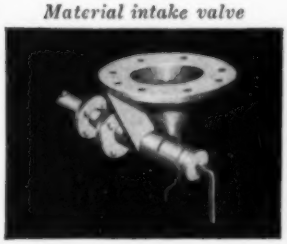
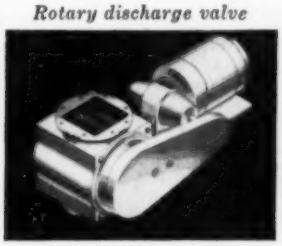
Dept. EM
U. S. Hoffman Machinery Corp.
103 Fourth Avenue
New York 3, New York

Material intake valve

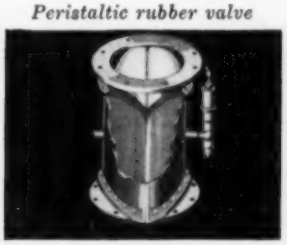


Hinge valve

Rotary discharge valve

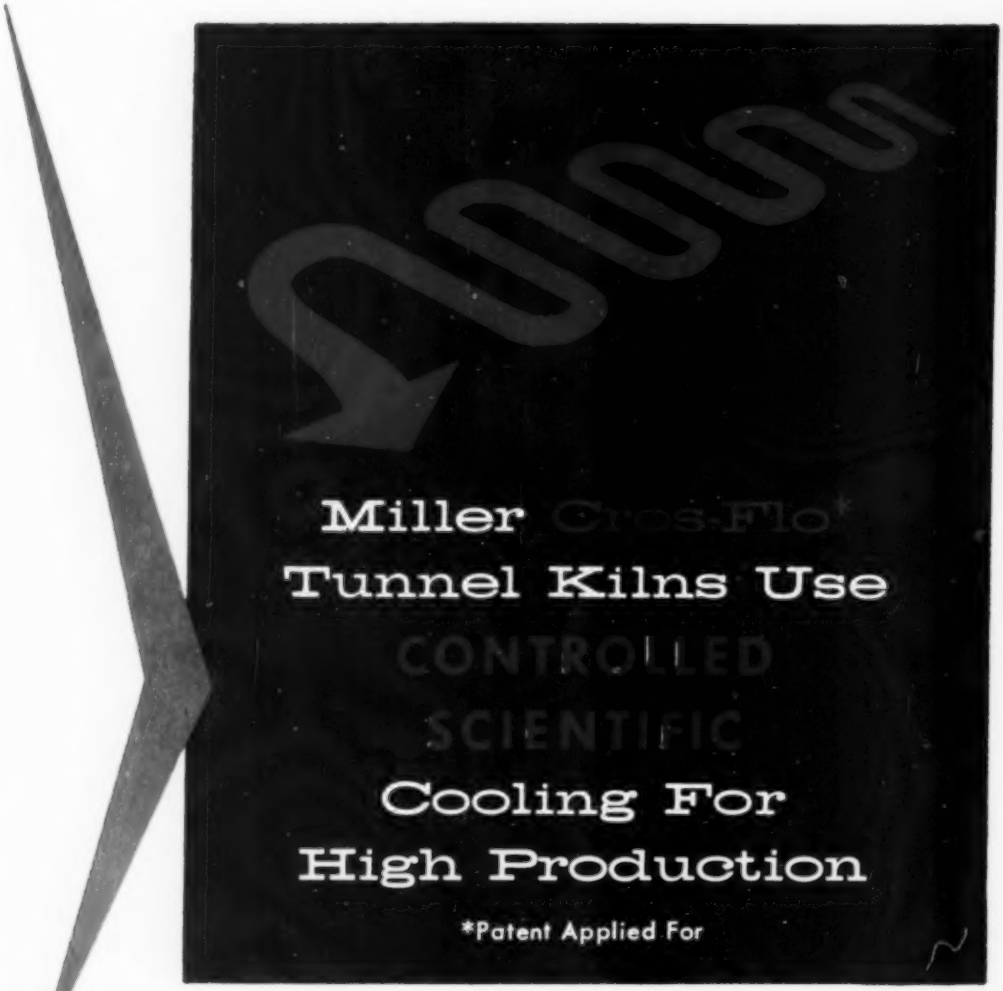


Peristaltic rubber valve



HERE'S YOUR ANSWER

to more profitable brick production



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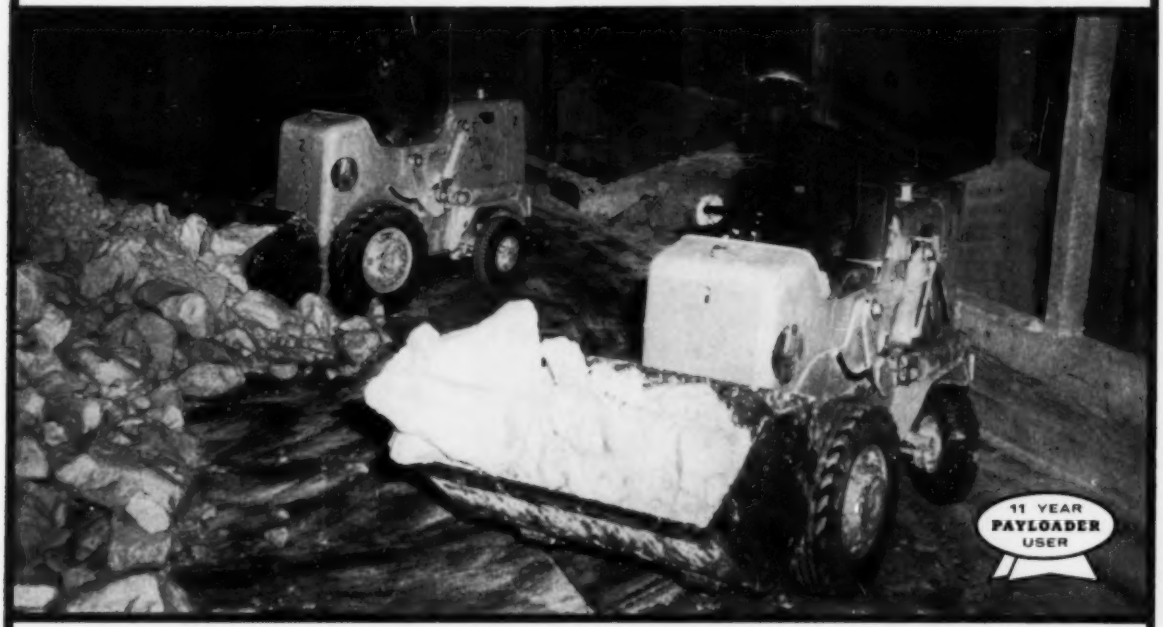
Six PAYLOADER® units



spark Huber's clay handling

J. M. Huber Corporation, Clay Division, with headquarters at Langley, S. C., is one of the largest producers of refined kaolin clays and has been using "PAYLOADER" tractor-shovels for 11 years to move the various grades of crude clay from storage sheds to hoppers for processing. Their two plants — at Langley and Graniteville — operate around the clock and presently use a fleet of six model HA (2,000 lb. Carry Capacity) "PAYLOADER" units.

C. H. Marvin, Jr., General Manager, speaking from long experience says, "the new style HA's with larger bucket capacity and roll-back bucket action have enabled us to increase our plant production without an increase in 'PAYLOADER' equipment. Torque converter drive has also reduced the maintenance problem."

In the pit, in the yard and in the plant you too can depend on "PAYLOADER" productivity and reliability to maintain output and reduce handling costs. There are nine "PAYLOADER" models to meet a wide variety of capacity and job conditions, including high-traction, 4-wheel-drive units up to 12,000 lb. carry capacity.

There's a Hough Distributor with sales, and complete service facilities near you ready to discuss "PAYLOADER" possibilities for your operations.

Stripping overburden, loading from the pit, unloading boxcars, stockpiling, feeding hoppers, mullers and batchers . . . handling coke, coal, ashes, waste, shards and cullett — are some of the ways other modern clay, brick, ceramic and glass producers are taking advantage of adaptable, flexible and efficient "PAYLOADER" tractor-shovels.

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THE FRANK G. HOUGH CO.
753 Sunnyside Ave., Libertyville, Ill.
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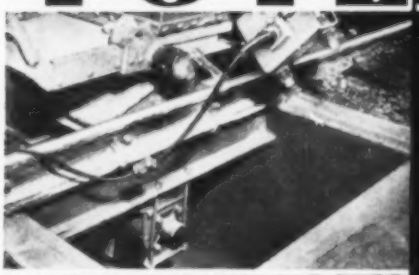
Company _____
Street _____
City _____ State _____

12-A-4

TOTE SYSTEM* Cuts Material Handling Costs, Improves Quality Control for O. HOMMEL CO.

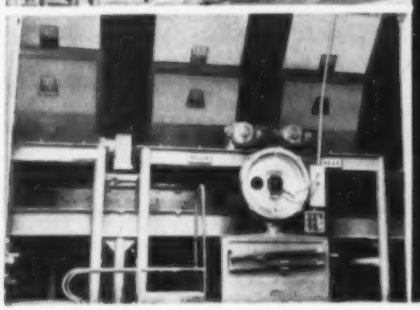


Ingredients are delivered to the Hommel railroad siding in bulk hopper cars. From a Hommel designed bulk pit beneath the siding, they are conveyed inside the plant.

At a two-bin filling station, the ingredients are discharged into the Tote Bins. As one Bin fills, the screw conveyor automatically conveys the material to the other Bin.

The Bin is removed by Fork truck and taken to the storage area. Tote Bins effect a 15 per cent saving in warehouse space.

From storage, Bins are transferred to a six-Bin discharging station. Tote Tilts discharge the contents of the Bins into a screw conveyor. Various ingredients required for a given batch are discharged together.



Dual dial arc Howe scales control the discharge. The scales are set for the desired amounts and the required poundage is introduced from the bins into the screw conveyor. The materials then go through a vibratory conveyor to a batch hopper.

The O. Hommel Company of Pittsburgh, which in 1958 built one of the largest ceramics research centers in the nation, also is pioneering in better, more economical methods of bulk handling.

The company in 1958 installed a Tote System consisting of 250 aluminum Tote Bins, together with automatic filling, discharging and weighing equipment. The system is used to handle major ingredients in the manufacture of three basic types of frit—porcelain enamel ground cover, ground cover and pottery frit. Since the Tote installation, O. Hommel company reports:

- Substantially reduced labor requirements for handling
- Elimination of recurring unit container costs
- Greater versatility since the bins may be stored inside or out, and may be used to handle different materials
- Improved housekeeping, sanitation and employee morale
- Improved quality control by simplifying the accurate weighing of ingredients

Why not let our engineers survey your plant at no obligation. Meanwhile, write for new catalog with complete details.

TOTE SYSTEM, INC.

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Beatrice, Nebraska

*Tote and Tote System Reg. U. S. Pat. Off.

"exactly the same as last time!"

Lot after lot after lot—you can rely on TAM, with utmost confidence, for consistently uniform opacifiers. In any desired quantity, too.

At TAM, knowledge is blended with experience—modern facilities and equipment with latest techniques—research and development with ceramic engineering ... toward supplying quality materials of consistent uniformity.

If you are having difficulty with uniformity or any other problem, call TAM. Our field representatives, ceramic engineers all, are experienced in providing unmatched service.

TAM... the complete line
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Executive and Sales Offices: 111 Broadway, New York City
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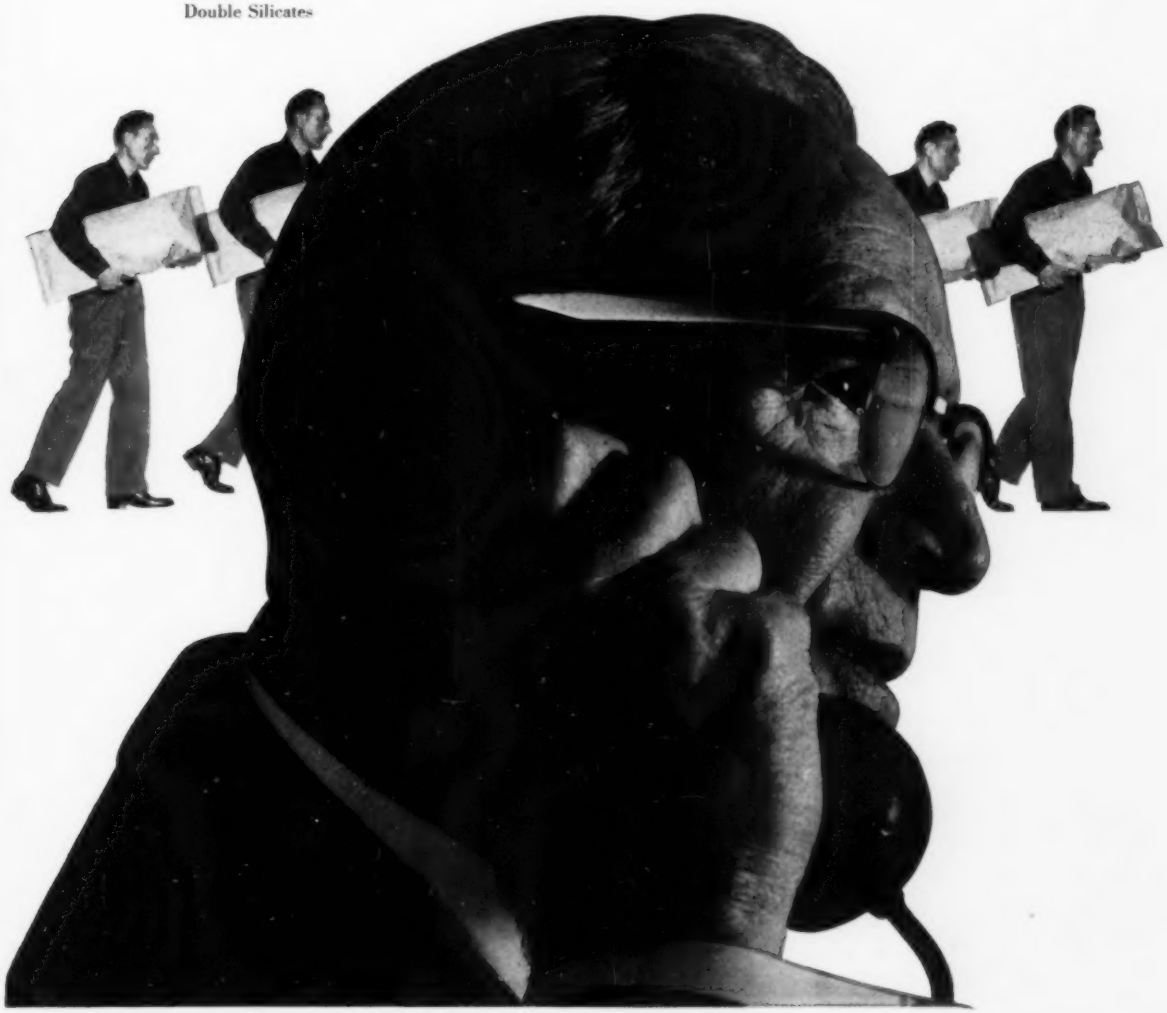
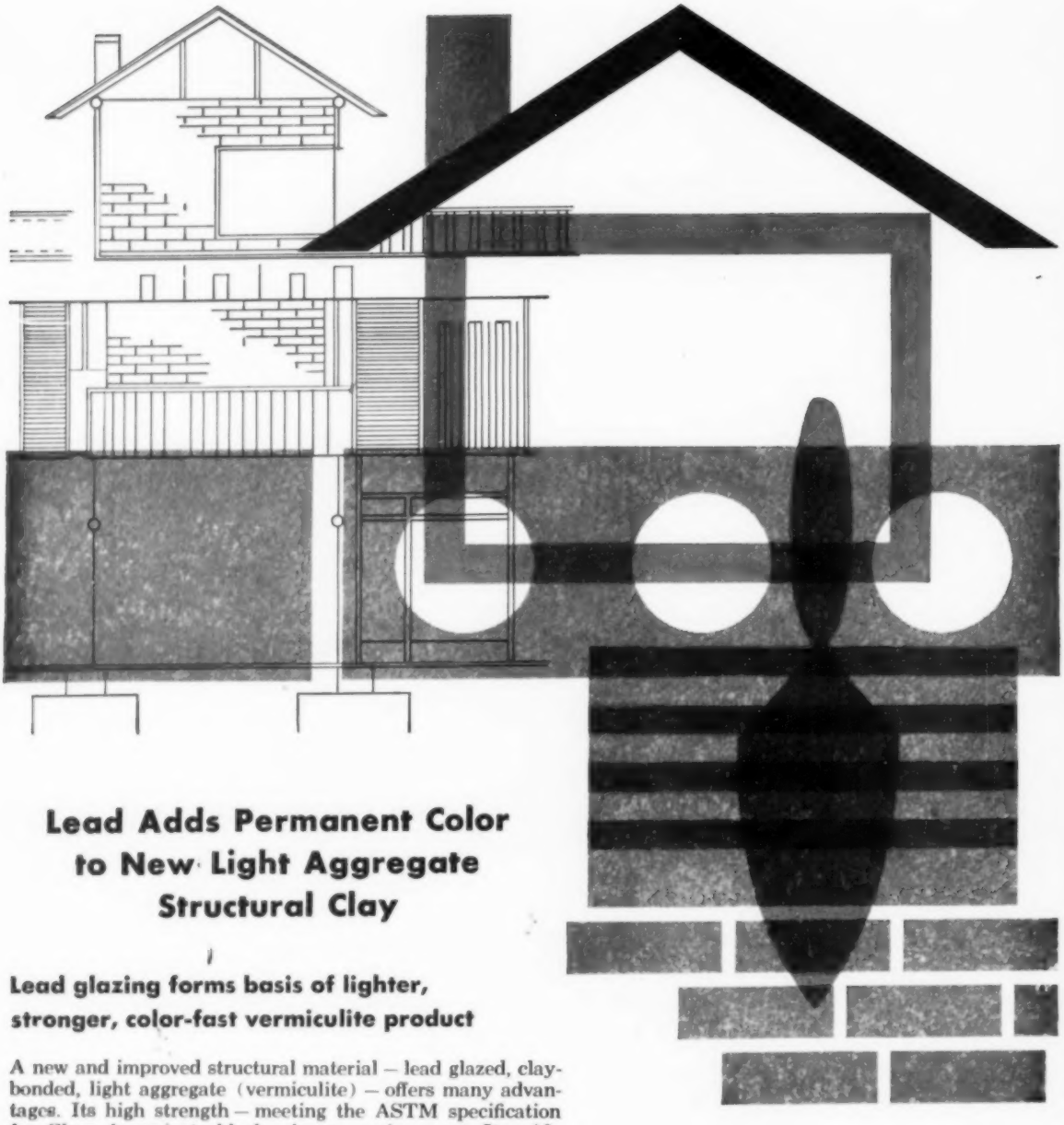




Lead Adds Permanent Color to New Light Aggregate Structural Clay

Lead glazing forms basis of lighter, stronger, color-fast vermiculite product

A new and improved structural material – lead glazed, clay-bonded, light aggregate (vermiculite) – offers many advantages. Its high strength – meeting the ASTM specification for Class A concrete block – is one major asset. Its wide range of permanent color is another. Thus it provides the construction industry with a new structural clay product for both interior and exterior use with integral color styling and a smooth, self-cleaning surface.

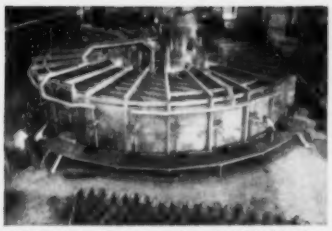
In developing the glaze, the Zonolite Corporation tested a variety of glass compositions. Of all these only lead glazes gave consistently good results in the temperature range up to 2000°F. Lead is important in these glazes because it gives a controlled viscosity range, allowing reaction of the glaze with the body but not allowing excessive soaking of the glaze into the porous body.

This new product is another example of how the structural clay products industry has relied upon lead glazes . . . on brick, tile, and other structural clay materials to provide more useful, beautiful and marketable products. For more information, write to: Lead Industries Association, 60 East 42nd Street, New York 17, N.Y.

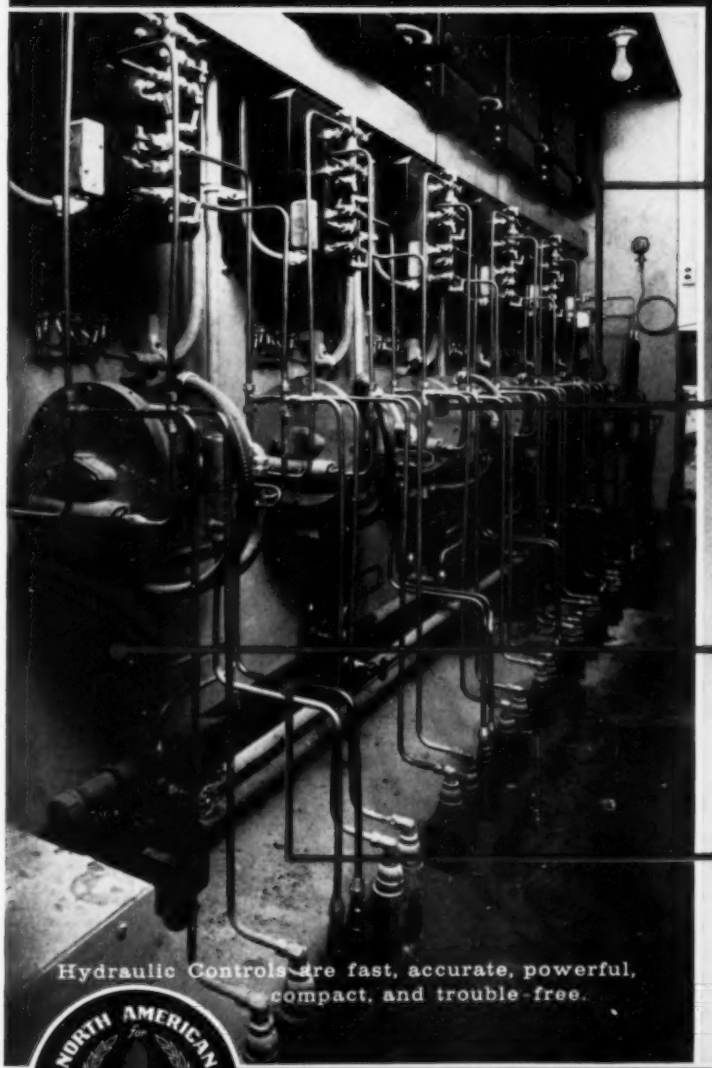
LOOK AHEAD WITH LEAD

1964

Canadian Steel Wheel Ltd. uses combustion controls by North American



60' Rotary Furnace heats 348 blocks (foreground) for press forging railway wheels.



Hydraulic Controls are fast, accurate, powerful, compact, and trouble-free.

Furnace Pressure ±0.0025" wc — controlled by this North American 16" diaphragm Regulator operating the damper on a 60' CANEFCO furnace.

Fuel-air ratio set on control panel for each of 5 zones is *accurately maintained* at all flow rates by North American Regulators. Flow is controlled by North American crank type cylinders on remote fuel valves.

Light weight and compactness allow regulator to be bolted directly on instrument panel without supports. Manual operation is achieved by panel-mounted push-button positioning of the fuel valves.

Pressurized return lines permit low cost installation using small tubing. Pump can be above or below unit.

For engineering information, call your nearby North American Combustion Engineer or write for Bulletins

NORTH AMERICAN for COMBUSTION and Hydraulic Controls

The North American Mfg. Co.
Cleveland 5, Ohio

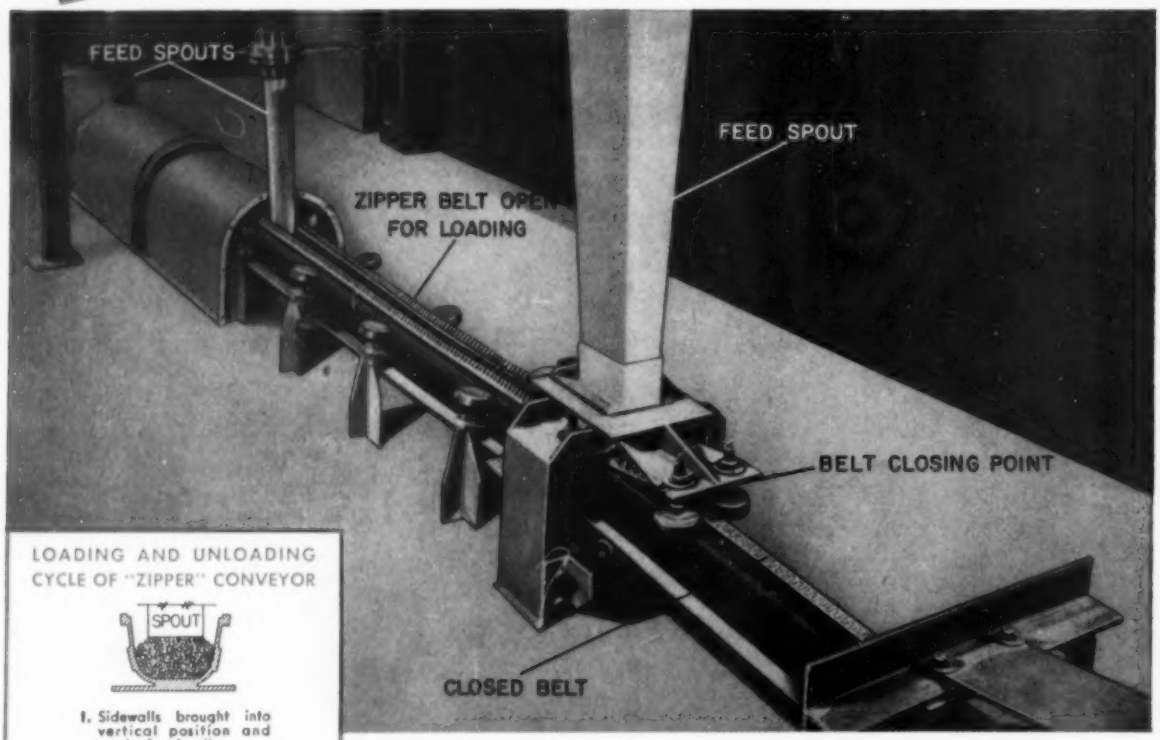
STEPHENS-ADAMSON

EXCLUSIVE

"ZIPPER"*

CLOSED-BELT

CONVEYOR-ELEVATORS

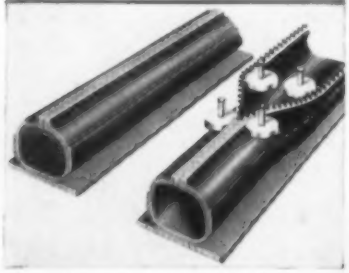


LOADING AND UNLOADING CYCLE OF "ZIPPER" CONVEYOR

1. Sidewalls brought into vertical position and ready for loading.

2. Flexible tube completely closed for conveying and elevating.

3. Rubber ZIPPER belt open for discharge, cleaning and return run.



Upper left unit closed and loaded. Lower right shows how belt is opened and closed by system of ball bearing rollers. (Rollers are mounted on a rigid framework)

CONVEYS AND ELEVATES BY CONTINUALLY WRAPPING MATERIAL IN A PACKAGE... MOVING THE PACKAGE AND ITS CONTENTS TO A NEW LOCATION AND GENTLY UNWRAPPING IT!

Literally a moving material-carrying conduit, the ZIPPER Conveyor is capable of transporting bulk materials in any plane, to considerable heights and around obstructions. Its great advantage is that bulk materials may be conveyed within the belt completely sealed and dust-tight. Material doesn't slide, isn't scooped, pushed or thrown but is gently carried over great distances without breakage, agitation or segregation. The ZIPPER Conveyor-Elevator provides versatility of layout and profitable material handling advantages you won't want to overlook.

*PATENTED

WRITE FOR BULLETIN 349

S-A

ENGINEERING DIVISION

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1. Advertised Goods

2. New Products

Appearing in this issue...

More saleable ware at a very high production rate, plus economical operation day after day is the result of the Miller Equipment Co's. Crosflo tunnel kiln.

10/Circle on Reader's Service Coupon

More Production—no hot spots. These are the features of the Flat Flame Burners by The North American Mfg. Co.

11/Circle on Reader's Service Coupon

All firing needs are met by Orton standard pyrometric cones made by The Edward Orton Jr. Ceramic Foundation.

12/Circle on Reader's Service Coupon

Top grinding with a high efficiency dry pan by Clearfield Machine Co. The new model 900 comes in 8½ or 9-ft. diam. and features a direct motor underdrive.

13/Circle on Reader's Service Coupon

HOW TO USE:

All you do is circle the number of the editorial item or the page number of the advertisement on this card, and mail it to us.

Heavy-duty portable conveyor line from Barber-Greene that's designed to handle sand, gravel, stone, cinders, chemicals, wet concrete, coal and other bulk material at high capacity and low cost.

14/Circle on Reader's Service Coupon

The Pack-Hauler can load, haul and unload 6,000 brick in a matter of minutes. Affords increased profits, lower delivery costs and less inventory. A product of American Truck Body Co.

15/Circle on Reader's Service Coupon

1-60

10 Miller Equipment Co.
11 The North American Mfg. Co.
12 The Edward Orton Jr. Ceramic Foundation
13 Clearfield Machine Co.
14 Barber-Greene
15 American Truck Body Co.
16 Pearne And Lacy
17 Coors Porcelain Co.
18 American Zinc Sales Company
19 Tam, Div. of National Lead Co.
20 Chambers Bros.
21 Robinson Ventilating Co.
22 Swindell-Dressler
23 Allied Div. Of Ferro Corp.
24 Kimberly Clark Corp.
25 Kaiser Aluminum
26 Ohio Kiln
27 Crescent Belt Fastener Co.
28 Builders Equipment Co.
29 Denver Fire Clay Co.
30 Wellsville Fire Brick Co.
31 Simpson Mix-Muller
32 Signode Steel Strapping Co.
33 Mason Color And Chemical Works, Inc.
34 Steody Co.
35 Ferro
36 Harbison-Walker Refractories Co.
37 Bickerstaff, Inc.
38 Aluminium Limited
39 Foundry & Machine Co., Inc.
40 Sanford-Day
41 Harrop Ceramic Service Co.
42 Williams Patent Crusher & Pulverizer Co.
43 Acme Steel Strapping
44 The Frank G. Hough Co.
45 A Varco
46 Bristol Co.
47 Falk Corp.
48 Morton Bros. Co.
49 Philadelphia Quartz Co.
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54 Fuller Mfg. Co.
55 Walsh Refrax
56 Dodge Mfg. Co.
57 Construction Aggregates Corp.
58 Chisholm Boyd & White
59 American Truck Body Co.
60 Eagle Iron Works

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Page 3 Bickerstaff, Inc.
Page 2 Bonnot Co.
Page 112 Bradley Machine Co.
Page 116 & 117 Brick & Clay Record
Page 7 Builders Equipment Co.
Page 72 Cedar Heights Clay Co.
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Page 4 Ferro Corp. (Color Div.)
Page 70 Fremont Brick Co.
Page 100 Gates Rubber Co. (The)
Page 39 General Refractories Co.
Page 71 Gladdieon, McBean & Co.
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Page 115 Havens (F. B.) & Sons
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Page 111 Hendrys (Dwight E.) & Assoc.
Page 117 Hummel (O.) Co. (The)
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Page 36 Illinois Clay Products Co.
Page 8 Kimberly-Clark Corp.
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Page 78 Sanford-Day Iron Works
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Page 97 Steody Co.
Page 70 Swank's (Walter C.) Sons
Page 22 & 23 Swindell-Dressler Corp.
Page 119 Tashtoulos (E. C.) Mfg. Co.
Page 74 Timken Roller Bearing Co.
Page 15 Titanium Alloy Mfg. Co.
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Page 102 U. S. Borax & Chemical Corp.
Page 11 U. S. Hoffman Machinery Corp.
Page 103 Universal Vibrating Screen Co.
Page 6 Vanderbilt (R. T.) Co.
Page 19 Walsh Refractories Corp.
Page 28 Westinghouse Electric Corp. (Sturtevant Div.)
Page 21 Williams Patent Crusher & Pulverizer Co.
Page 109 Zonolite Co.

I'm also interested in those items shown in the Advertisements. Please have manufacturer send me literature and information.

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Mfgrs Name _____

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This card void after March 31, 1960

Pearne And Lacy die-lockers are self contained units specially designed for high speed locking and un-locking. Available for either hydraulic or air operation. Easily replaced with die changes.

16/Circle on Reader's Service Coupon

Pipe dies of Coors Ceramics reportedly outlast metal dies 10-1. Coors Porcelain Co. is experienced in production of ceramic die and bell liners for sewer pipe machines or ceramic parts for other extrusion equipment.

17/Circle on Reader's Service Coupon

For low shrinkage in the manufacture of your ceramic products AZO *ZZZ* 88 is available. This zinc oxide is already calcined at high temperature in a carefully controlled atmosphere. Large partical sizes, low bulk (75 pounds per cu ft.) Has thin glaze consistency. American Zinc Sales Company.

18/Circle on Reader's Service Coupon

A complete line of Zirconium Opacifiers is offered by Tam, div. of National Lead Co. Boasts uniformity from lot to lot, thus producing consistent results.

19/Circle on Reader's Service Coupon

#2-11 auger machine in-line or right angle installation. Has compact one piece gear frame vacuum case. Is rigid, short, has high tensile strength shafting and antifriction bearings throughout. A product of Chambers Bros.

20/Circle on Reader's Service Coupon

Manufacturers of air handling equipment for the ceramic industry Robinson Ventilating Co. offers custom engineers fans, blowers and exhausters to meet the specific requirements of your tunnel kiln, periodic kiln or product dryer.

21/Circle on Reader's Service Coupon

Swindell-Dressler maintains an extensive program of research and development for the improved production of ceramic products. Work is being conducted currently on the fast firing of heavy clay products, lightweight clay units, and low-cost clay calcining.

22/Circle on Reader's Service Coupon

Some of the Allied firsts include patented freeway transfer system double track waste heat drier, patented side-Damper control and patented longitudinal flue system. Allied Div. of Ferro Corp.

23/Circle on Reader's Service Coupon

Reduce wear on augurs, dies, liners —lubricate with Additive A clay conditioned by Kimberley Clark Corp. Adds up to 50% to the life of knives, augers, dies and liners with effective body lubrication.

24/Circle on Reader's Service Coupon

Complete detailing portfolio for industrial roofing, siding and insulated sandwich wall now available from Kaiser Aluminum. In one master file complete in four folios is offered dozens of typical details.

25/Circle on Reader's Service Coupon

Ohio Tunnel Kilns made by Ohio Kilns for all types of ware and both the largest and smallest type production. Produce uniform burning and even colors with the least possible loss.

26/Circle on Reader's Service Coupon

Countersunk belt fasteners by Crescent Belt Fastener Co. help to solve excessive abrasive conditions. Thus conveyor belting subjected to heavy abrasive work can now be readily joined for maximum service.

27/Circle on Reader's Service Coupon

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Permit No. 183
Chicago, Ill.

BUSINESS REPLY MAIL
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POSTAGE WILL BE PAID BY

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5 South Wabash Avenue

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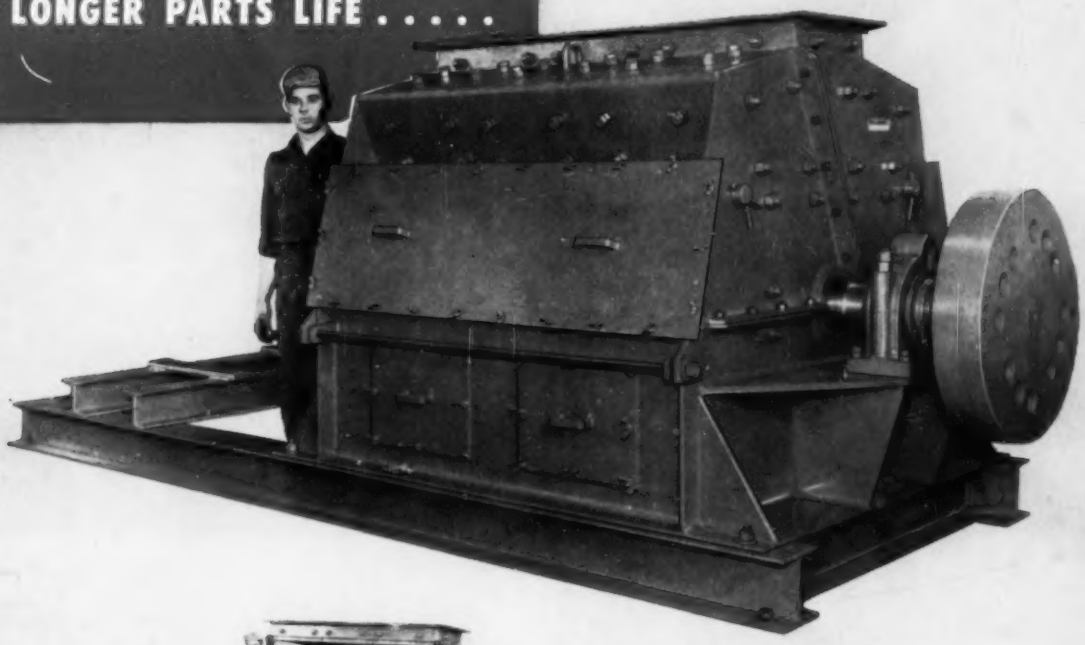
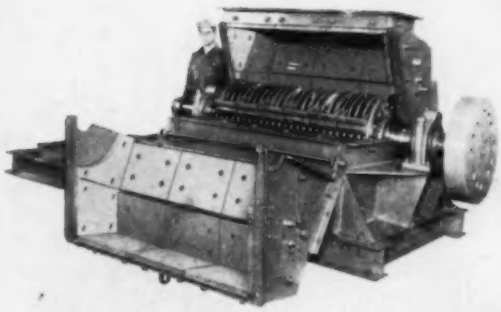
NEW DUAL "2-POINT" ADJUSTMENT INSURES MORE UNIFORM GRINDING, LONGER PARTS LIFE . . . . .

WILLIAMS *Reversible* HAMMER MILLS





Williams Reversible Hammer Mill with cover open.
Note these features:

- Super-strong reinforced steel plate frame
- Renewable wear-resistant manganese steel liners
- Heavy duty oversize forged steel rotor shaft
- Anti-friction self-aligning roller bearings in dust-tight housings
- Complete accessibility to interior for quick parts changing

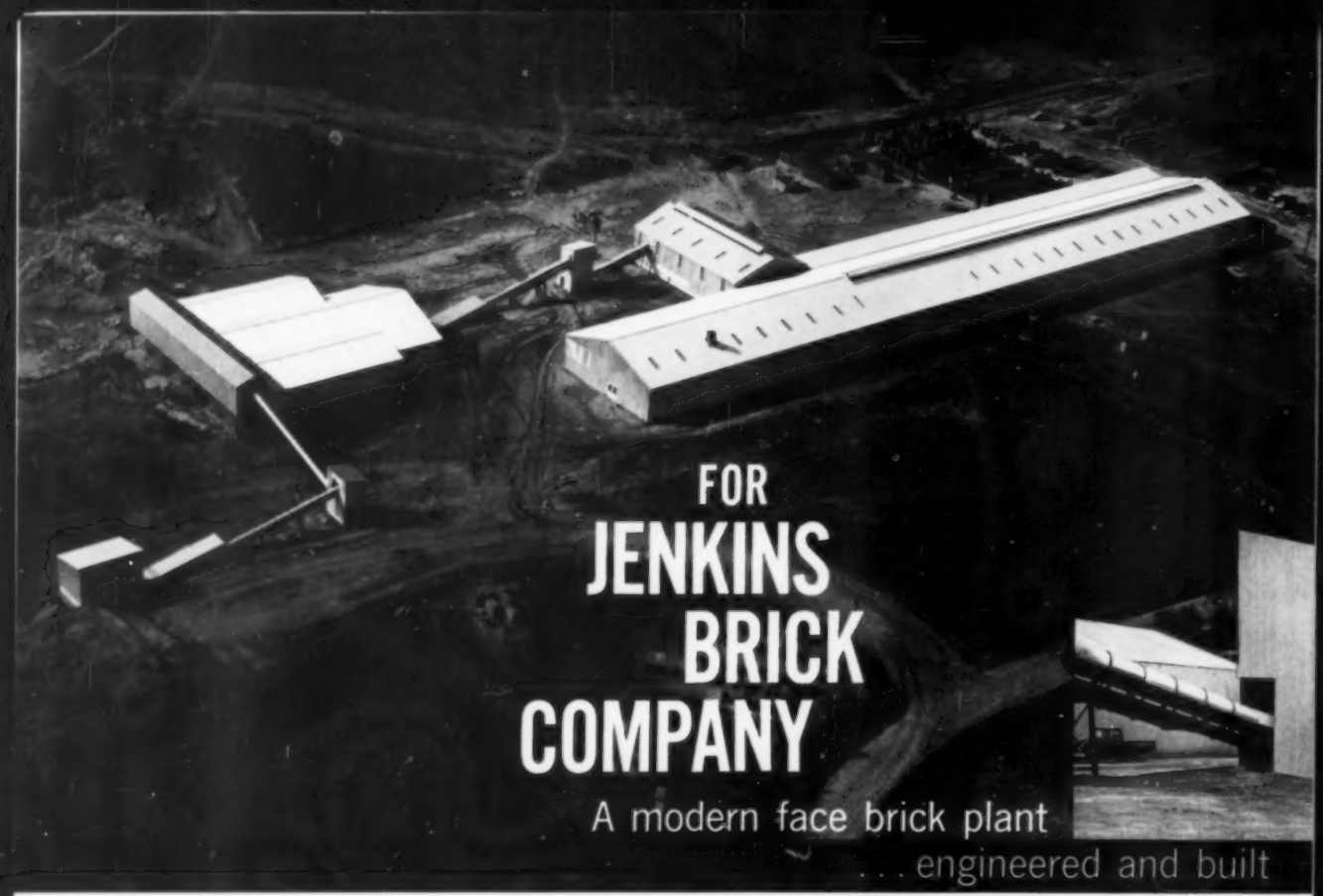
It's another Williams "first"—features not available in other hammer mills—that now makes it possible to maintain the original close clearances of *both* grinding plates *AND* cage sections against the rotating hammers. This easy-to-make "2-point" adjustment, in the most critical grinding area inside the hammer mill, gives absolute assurance of consistently uniform product quality.

In addition to the advantages of the Dual "2-Point" Adjustment, a Williams Reversible Hammer Mill substantially lowers upkeep expense by cutting hammer cost. Hammers can be operated in one direction today and another tomorrow simply by installing a simple reversing switch on the driving motor. Manual reversing of hammers no longer necessary. Grate bars also last longer. The double set of reversible manganese breaker plates, which last twice as long as other types, give four times the service! Maintenance and downtime are cut 50% or more.

Get all the facts about the hammer mill with *ALL* the top features.

WILLIAMS PATENT CRUSHER & PULVERIZER CO. • **2709 N. BROADWAY** • **ST. LOUIS 6, MO.**

WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World



FOR JENKINS BRICK COMPANY

A modern face brick plant
. . . engineered and built

with COMPLETE ENGINEERING and

CONSTRUCTION SUPERVISION by

Swindell-Dressler

Completed in less than a year from preliminary studies to operating plant, this new Jenkins Brick Company Coosada Division facility was "brought in" nicely under the estimated budget—due largely to the detailed cost control system which is a vital part of Swindell-Dressler management. The entire job reflects in every detail Swindell-Dressler's specialized experience and knowledge of industry requirements, all the way from preliminary studies through completed drawings to management of construction and the owner's key.

The Jenkins Brick assignment typifies the results that are obtained through Swindell-Dressler's complete services to management in the heavy clay products industry: These services are available in three basic phases, collectively or separately as desired.

Unloading fired bricks

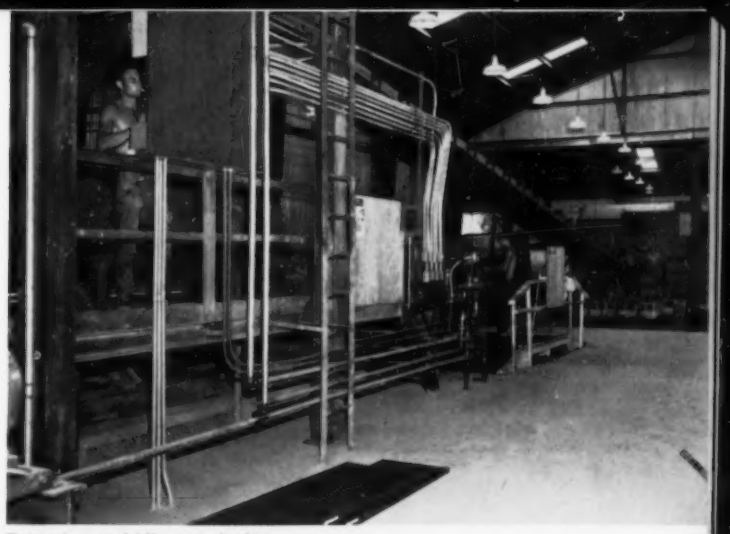
THE JENKINS PLANT

As the newest brick plant in the South, the Jenkins operation at Coosada, near Montgomery, Alabama, is a model of sound layout, efficient materials handling and modern drying and firing equipment. The 307 ft Dressler Tunnel Kiln holds 31 cars, each 9 ft 4 in. long by 6 ft 8 in. wide, and is producing 50,000 8 in. face bricks per 24 hrs. It is fed by a Dressler-Robinson Twin Tunnel Dryer 145 ft 6 in. long, holding 15 cars in each tunnel. The kiln features controlled oxidation and cooling zones, and is gas fired.

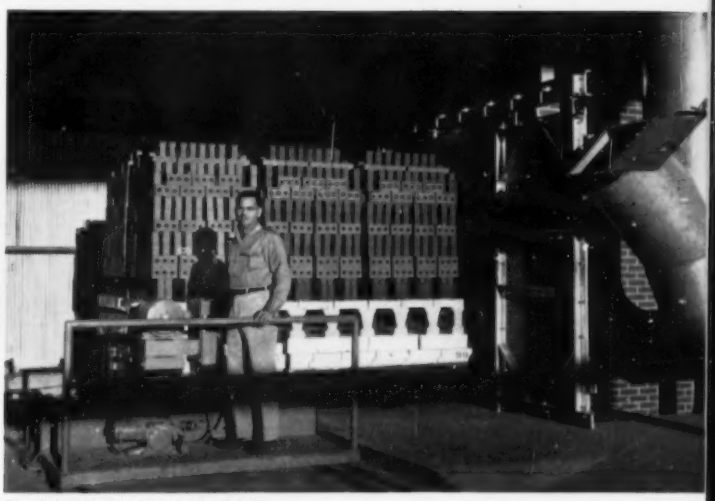
in less than a year

• *PHASE 1* includes preparation of a report bringing together sufficient data and cost estimates to present a clear over-all picture of the proposed project. It allows the client to make decisions regarding continuance of the project or its abandonment for reasons of cost or other pertinent factors. • *PHASE 2* carries the project forward through layout and design stages to completion of finished plans and specifications for proposed plant and equipment installation. • *PHASE 3* is the management of the entire program, including securing and evaluation of bids, purchasing, payment of bills and supervising performance of contractors. Thus, the client is relieved of all coordination activity, purchasing problems and many other details that are an inherent part of any construction program.

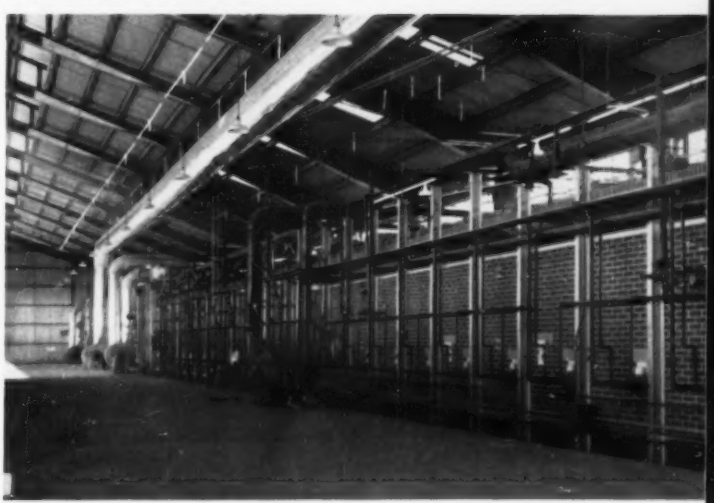
You are invited to discuss with Swindell-Dressler engineers all aspects of our services in relation to your forthcoming production requirements.



Extrusion and kiln car placing



Fired loads at exit end of kiln



Preheating and furnace zone of kiln

SWINDELL-DRESSLER CORPORATION

ENGINEERS AND MANUFACTURERS • PITTSBURGH 30, PA.

The SWINDELL-DRESSLER CORPORATION of Canada, Ltd., Ottawa, Canada

The Camera
Views the News

A boatload of rotary kiln expanded shale aggregate was shipped recently from Chicago to Spring Lake, Michigan, the first time that an entire boatload of such a material has ever been shipped in the United States. The aggregate, new in the Middle West but gaining rapid acceptance for use in lightweight concrete construction and in the manufacture of concrete building blocks, was loaded at the Material Service Corporation yard at 103rd Street and the Calumet River onto the ship "Marquis Roen". Consignee was the Spring Lake Ice & Coal Company, Spring Lake, Michigan, near Muskegon. The 9000 cubic yards of the aggregate in the shipment will be stocked at Spring Lake to serve the construction trade in Western Michigan. Picture depicts giant rail cranes situated on the deck of the "Marquis Roen" load the ship for the cross-lake trip to Spring Lake, Michigan.

• • • •

Conferees pause for luncheon in the nation's capitol during discussion of national pollution problems and remedial measures. Left to right: Arthur S. Fleming, Secretary, Department of Health, Education and Welfare; G. A. Robinson, President, National Clay Pipe Manufacturers, Inc., Washington, D. C.; Mark D. Hollis, Assistant Surgeon General, United States Public Health Service; and Congressman John A. Blatnik, Minnesota Democrat from the Eighth Congressional District. Robinson, general chairman of the 53 annual meeting of the American Society of Sanitary Engineering for plumbing and sanitary research, is the host.

Neil Dixon of Jacksonville, Fla. is celebrating 50 years in the brick business.

• • • •

The Expanded Shale Clay and Slate Institute held its seventh annual meeting the week of October 13th, 1959, at the Royal York Hotel, Toronto, Ontario. The Cooksville-Laprairie Brick Ltd. of Toronto was host member. More than fifty producers and their wives from the United States and Canada, representing twenty-seven of the Institute's member plants, attended the meeting. Pictured here are institute officers and Canadian hosts with wives.

A Look at The Latest in Industry News

Chemical Helps Solve Production Problems

Cooksville Laprarie Brick Ltd. of Canada is reportedly pioneering the use of Lignosol, a chemical to solve production problems arising in the manufacture of colored brick. Obtained by Lignosol Chemicals Ltd., of Quebec City, from the sulphite liquor which is a by-product of a neighboring newsprint mill, this chemical has been used heretofore by the ceramic industry, but largely as a binder to improve green strength before firing. It is reportedly the first time in Canada that the chemical has been put to work as a color deflocculant in brick manufacturing.

Merry Bros. Adding Two Kilns

Construction is now underway on a two-phase $4,000,000 expansion project at Merry Brothers Brick and Tile Co. Augusta, Ga. The program will add two additional kilns to the facilities of the 60-year old firm.

The first phase of the program is the construction of a new kiln with adjacent operational facilities capable of producing 36,000,000 additional bricks a year. This phase, scheduled to be completed by Oct. 1, 1960, will cost an estimated $2,500,000.

The second phase of the expansion will be a second kiln and accessory equipment. Plans call for this work, estimated to cost some $1,500,000, to begin construction during 1961 with completion scheduled for 1962. The second kiln will increase production by 36,000,000 bricks a year.

Under this program, the company will be able to produce a wider variety of ceramic products. These will include admixture products, surface treated and glazed ceramic products.

The expansion programs will be underwritten in part by the sale of 160,000 shares of common stock in the firm. A total of 20,000 shares of this stock will be offered to employes, directors and present stockholders at $7.41 a share. The 140,000 shares will be offered to the general public at $7.80 per share.

Pope Inspects Roofing Tile Pictures

His Holiness, Pope John XXIII inspects pictures of roofing tile from the Shrine of Emmaculate Conception Church of Washington, D. C. Charles McGee, v.p. Ludowici Celedon Co. Chicago, Ill., recently visited Italy on a business trip and presented the Pope with pictures of this church, the largest Roman Catholic Church in the Western Hemisphere. It is roofed with Ludowici Celedon

roofing. The architects were Maginis, Walsh & Kennedy of Boston.

Plans New Plant

J. B. Cordell of Houston, Texas, has bought a 98-acre tract near Mont Belvieu to build the Aztec Brick Co. Plant. An estimated 30 persons will be employed in the plant, which will utilize clay found in the Mont Belvieu and Barber Hills area of West Chambers County.

Depletion Study Continues

Representatives of the Clay Products Industry will continue their depletion debating, this time with the Cannelton Case slated to be brought before the Supreme Court in the fall of this year. The court in turn will determine the validity of the decision of the Circuit Court of Appeals which was in favor of the recent Cannelton depletion plea. A report on this will be released in November. The Cannelton case is similar to the argument in the Cherokee case except that in the later case only brick clay were under discussion. In the coming case firebrick will also be under discussion.

R. W. Harbison Dies

Ralph Warner Harbison, a member of the Board of Directors of the Harbison-Walker Refractories Co., Pittsburgh, Pa. died on December 12, 1959.

Harbison, 83, was the son of one of the founders of the Pittsburgh refractories firm and was known throughout the United States as "Mr. YMCA." He served as President of the Pittsburgh YMCA for 32 years and was founder of the YMCA National Council.

Three Changes at Texas Vit.

Walsh Refractories Corp., St. Louis, has announced the promotion of Ralph L. Sanford to Manager of its St. Louis plant. Sanford was formerly assistant to William P. Charbonnier, now Technical Advisor to the v.p in charge of Glass Refractory Sales.

It was also announced that Eugene D. Barron will serve in the capacity of assistant to Mr. Sanford in the production of Slip Cast Refractories and High Temperature Specialties. Dale L. Rockwell was appointed as assistant to Sanford in the manufacture of Fusion Cast Refractories for the glass industry.

Walsh Announces Changes

Three official changes in management positions of the Texas Vitrified Pipe Company, and the Southwestern Plastic Pipe Co. were announced by President Edward F. Clemens recently.

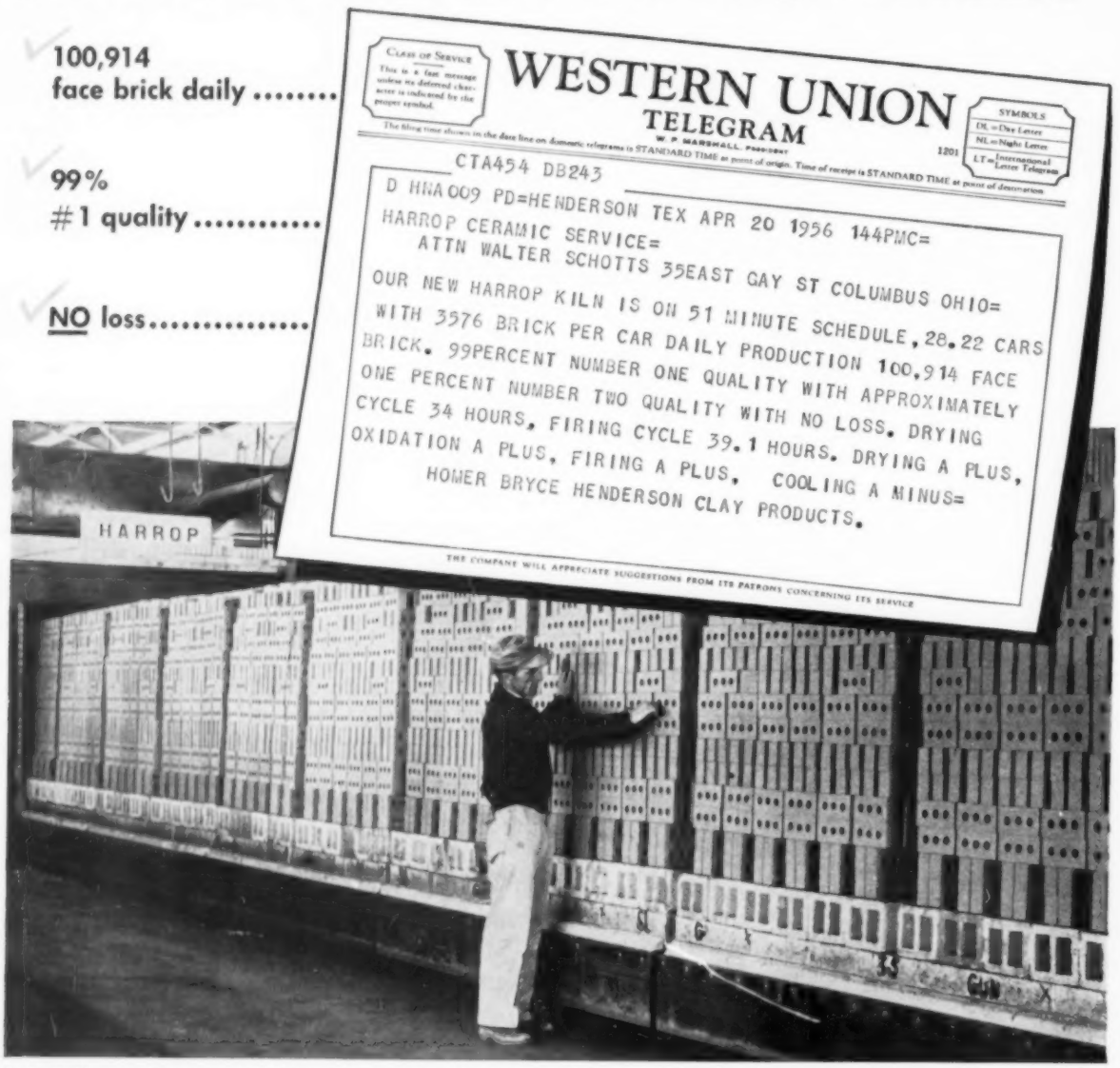
J. F. Bailey, general manager and secretary of the companies, has been appointed Executive v.p. David E. Clemens, formerly assistant general manager of the Texas Vitrified Pipe Company, has been named a director and also becomes Secretary and General Manager of the clay pipe company. E. W. Hendrick, general manager of the Southwestern Plastic Pipe Co. has been elected Secretary and a director of the firm. He will continue in his position as managing head of the plastic pipe manufacturing company.

Here's how HARROP KILN No. 3 performs at Henderson Clay Products

✓ 100,914 face brick daily .....

✓ 99% #1 quality .....

✓ NO loss .....


CLASS OF SERVICE
This is a fast message unless its deferred character is indicated by the proper symbol.
WESTERN UNION
TELEGRAM
W. P. MARSHALL, PRESIDENT
SYMBOLS
DL = Day Letter
NL = Night Letter
LT = International Letter Telegram
The filing time shown in the date line on domestic telegrams is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.
CTA454 DB243
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HARROP CERAMIC SERVICE=
ATTN WALTER SCHOTTS 35EAST GAY ST COLUMBUS OHIO=
OUR NEW HARROP KILN IS ON 51 MINUTE SCHEDULE, 28.22 CARS WITH 3576 BRICK PER CAR DAILY PRODUCTION 100,914 FACE BRICK. 99PERCENT NUMBER ONE QUALITY WITH APPROXIMATELY ONE PERCENT NUMBER TWO QUALITY WITH NO LOSS. DRYING CYCLE 34 HOURS, FIRING CYCLE 39.1 HOURS. DRYING A PLUS, OXIDATION A PLUS, FIRING A PLUS, COOLING A MINUS=
HOMER BRYCE HENDERSON CLAY PRODUCTS.
THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE
HARROP

Latest Harrop Dryer and Kiln installation for Henderson Clay Products, Henderson, Texas. Twin Dryer is 184' long, Tunnel Kiln 421' long. Natural gas fired, with firing temperature approximately 2150°F.

Again . . . .
Practical Ceramic Engineering, put profitably to work in Tunnel Kilns . . . Dryers . . . Plant Design

HARROP

Very probably Harrop can help *you* speed production and raise quality of whatever ceramic products you make. A non-obligating consultation on your proposed new installation will be gladly arranged.

Harrop Ceramic Service Co.
35 EAST GAY STREET COLUMBUS 15, OHIO

Harbison-Carborundum Announces Personnel Changes

Four Company management men, Messrs. Maurice E. LeRoy, Karl H. Sandmeyer, and Arthur L. Donnenwirth of Falconer, New York, and Mr. Roy W. Brown of Perth Amboy, N. J. have been appointed to key positions in Harbison-Carborundum Corp., Falconer, New York, according to an announcement by Eugene L. O'Meara, President of the new $5 million fused refractories firm.

LeRoy, formerly Assistant Division Controller of Carborundum's Refractories Division, was elected Secretary-Treasurer of Harbison-Carborundum Corporation, recently organized on an equal ownership basis by Harbison-Walker Refractories Company, Pittsburgh, Pa. and The Carborundum Co., Niagara Falls, N. Y., Sandmeyer, formerly Supervising Engineer of Fused Cast Refractories for Carborundum's Refractories Division, was appointed Technical Director of Harbison-Carborundum. Arthur L. Donnenwirth, formerly Manager of Carborundum's Monofrax® Fused Refractories Plant at Falconer, was appointed Manager of Manufacturing for the new firm. Roy W. Brown, Product Sales Manager of Carborundum's Refactories Division, Perth Amboy, N. J., was appointed Sales Manager for Harbison-Carborundum.

Wadsworth Ships Internationally

Wadsworth Brick Co. located in Wadsworth, Ohio and also in Baltic, Ohio last year shipped a Smooth brick order to Soa Paulo, Aantos, Brazil. This year they are planning to ship Smooth brick to Korea.

Lippincott Promoted at Chas. Taylor

Raymond Lippincott Jr., recently became manager of the South Shore, plant of the Charles Taylor Sons Co. in Portsmouth, Ohio. Everett G. Couch, manager of the plant for the last eight years became manager of production. Couch will be in charge of production at the Cincinnati and South Shore Plants. Lippincott formerly was employed at the Olive Hill (Ky.) plant of the Harbison Walker Refractories Co.

Region 3 Elects Officers

An election of officers for the Mid-Atlantic Region (Region III) of the Structural Clay Products Institute was held on Wednesday, December 2, 1959 at a meeting in the Sheraton-Belvedere Hotel, Baltimore, Maryland. The same officers who served Region III during 1959 were unanimously elected to serve in 1960, and are as follows: President: Morriss Corbman, New Jersey Shale Brick & Tile Corp., Somerville, New Jersey. Vice-President: G. Victor Cushwa, Victor Cushwa & Sons, Inc., Williamsport, Maryland. Treasurer: Charles E. Alwine, Alwine Brick Company, New Oxford, Pennsylvania. Secretary: Walter M. Whitehall, Region III Structural Clay, Products Institute, Philadelphia, Pennsylvania.

Gladding, McBean & Co. Declares Regular 25c Quarterly Dividend

The Directors of Gladding, McBean & Co. today declared the regular quarterly dividend of 25c per share on the Company's capital stock payable January 22, 1960 to shareholders of record January 6, it was announced by R. A. Eccles, Secretary.

Findlay Changes Name

J. M. Lambi, President of Findlay Clay Products Co., Findlay, Ohio announced recently that the Company has changed its name to Findlay Refractories Company. The purpose of this name change is to better identify the Company's products to its customers. The change of name was approved at a special stockholders' meeting on September 25, 1959.

Tom Grimm Joins Zonolite

Tom Grimm, Assistant Director of Engineering and Technology, Structural Clay Products Institute, announced his resignation recently. He went with SCPI in 1949. From 1953 thru 1956, he was with the Clay Products Association of the Southwest as Executive Secretary and returned to SCPI in his present capacity in the latter part of 1956. He has joined the Zonolite Co. in Chicago.

Roanoke, Va. Site of Expanded Shale Meeting

The annual meeting of the Expanded Clay and Shale Assn. will be held Jan. 28 and 29 at the Hotel Roanoke in Roanoke, Va. Among the speakers slated to appear are Dr. W. C. Bell of North Carolina State College, and John D. Mitchell, g.m. Western Brick Co., Danville, Ill. A tour of the Virigina Lightweight Corp. plant on the 28th will be a highlight of the two-day session.

Mapleton Completes Tile Run

Mapleton Development Corp. of Mapleton, Ohio recently announced that it completed its first experimental runs of structural facing tile made from a new lightweight aggregate. The aggregate is said to reduce the weight of tile as much as 30%. The corporation is using the former plant of Mapleton Clay Products Co. to find new uses for locally-mined clay and shale, and produce lighter brick and tile. It is a joint venture of Stark Ceramics Inc., of East Canton, Metropolitan Brick Inc. of Canton and Natco Corp. of Pittsburgh.

Back on the Job

George Anderson, vp in charge of sales, Central Commercial Co. in Chicago is back on the job after being sidelined with an injury for a short time.

Editors Express Thanks

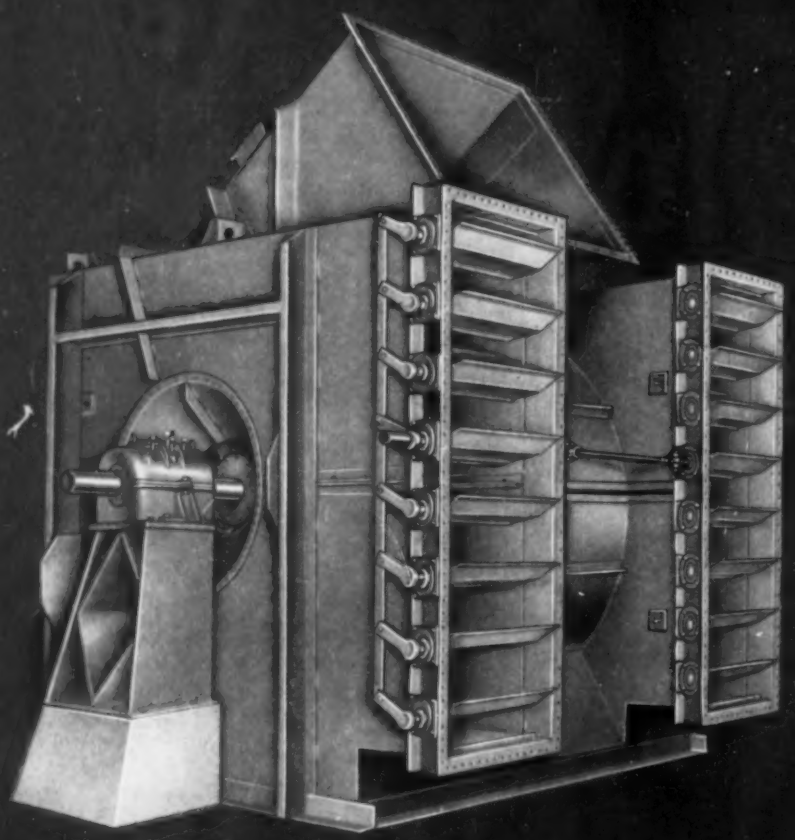
The editors of Brick and Clay Record wish to express their appreciation to the following people and organizations for their greetings during the holiday seasons:

Miller Equipment Co., Len Kirsten of SCPI, Gene Tinsley of Kaiser Aluminum, Allied Brick Sales, Ralph Hanes of Dodge Mfg. Co., Structural Clay Products Research Foundation, W. F. Hoggan of Home Brick Ltd., Morton Printing Co., Williams Patent Crusher & Pulverizer Co., Inc., A. B. Segur & Co.

Also: Region 5 of SCPI, A. W. Hamrick of Signide Steel Strapping Co., Gregory J. Berg and Carl S. Meyer of Allis Chalmers, Ken MacDonald, Edward Valens, Florida Georgia Brick and Tile, Bob Ferguson, J. Henry Brown of the Yale & Towne Mfg. Co., Carvel Tefft, Howard Carlson of Signode Steel Strapping Co. Uhrden, Inc., A.E. Wise, Herbert Materials Cia. de Productos de Arcilla, S. A. Clay Products Co. Inc., I. S. Johnson of Rhodes Chemical Co., Dean Tinkler, Harold Kasten of Kasten Bros. Brick Co., and George Eyerly of Malvern Brick and Tile Co.

Sintering • Ore Beneficiation • Rotary Kilns

TOUGH JOBS REQUIRING TOUGH FANS



Westinghouse offers you a Heavy-Duty Fan...
the right type...the right size...the right blading

These fans are designed specifically to handle abrasive gases at elevated temperatures and high pressures!

Erosion Resistance:

- Ribbed blade liners for severe abrasive service
- Flat blade liners to prevent material build-up
- Flat housing and scroll liners

All liners easily replaceable in the field.

More Information?

Call your nearest Sturtevant Division Sales Engineer, or write Westinghouse Electric Corporation, Department J-7, Hyde Park, Boston 36, Mass.

J-80683

MANUFACTURING PLANTS AT HYDE PARK, MASS., LA SALLE, ILL., BERKELEY, CALIF.

YOU CAN BE SURE...IF IT'S Westinghouse®

Watch "Westinghouse Lucille Ball-Desi Arnaz Shows" CBS-TV Alternate Fridays

New Products

Screw Conveyor Drive

A new compact helical gear drive, designed especially for screw conveyor installations, has been announced. Various drive assemblies can be furnished . . . the basic drive (reducer with drive shaft and seal housing) can be combined with standard trough end as well as with a new Falk motor mount. The drives are made in six sizes, each with ratios of 4:1, 9:1, 14:1 and 24:1, for all conveyors requiring ½ to 30 hp. *Falk Corp.*

47/Circle on Reader's Service Coupon

Electric Vibrolator

A new concept in electric vibrators. A new mounting aspect puts the vibrational orbit close to and parallel with hopper wall thereby eliminating need for reenforcing plate on thinnest hopper materials. Quick clamp mounts can be furnished for jobs where vibrator must be moved from place to place or

brought indoors for protection against theft. Designated the DHE-111 "Motomagnetic" electric vibrator, this unit offers stepless speed control from 2,000 to 10,000 VPM while operating. The DHE-111 is designed for quiet, powerful vibration on the most difficult installations. Use it to insure a constant flow of materials from bins and hoppers for chemical plants, food packaging, concrete molds, move—sift—compact bulk materials of every type. *Marten Engineering Co.*

48/Circle on Reader's Service Coupon

Clay Dispersion

Sodium silicates fluidize industrial clays quickly and efficiently. This property is useful in the beneficiation of ores, purification of clay deposits, preparation of slips for castings and for extrusion of brick, for molding and for coatings.

Soluble Silicates are liquids and solids, carefully controlled to specifications, making them easily adaptable to automatic equipment. These advantages result in lower processing costs and improved product characteristics — purity, recovery, casting rate, green strength, modulus of rupture both dry and fired. *Philadelphia Quartz Co.*

49/Circle on Reader's Service Coupon

40-Ton Lorain Crawler Crane

A 40-ton crane in the 1¼ yard class Model 56. Is mounted on a 14′ long, 13′ wide crawler and handles up to 110′ of boom. The turntable is connected to the crawler by well-known "Shear-Ball" connection. This is the same, huge single-race ball-bearing on which Thew recently announced an unprecedented 10-year warranty. Smooth, rock-steady swings and elimination of adjustment, maintenance, and lubrication problems common to roller or center pin designs are the main advantages of the "Shear-Ball" connection. *Thew Shovel Co.*

50/Circle on Reader's Service Coupon

Plibrico "80"

Plibrico "80" is a plastic refractory designed for extremely high temperature service in various steel mill applications, as well as in aluminum remelt furnaces, electric furnace roofs, alloy steel, aluminum and brass ladles, and in burner cones. This new material, recently introduced by Plibrico Company, Chicago, Illinois, also is used for doger combustion chambers, tunnel kilns, firing hoods and causter retort furnaces. Having an alumina content of 80%, Plibrico "80" is nonwetting to most metals, including alunum, steel and brass.

Service temperature limit of the product is 3300°F. and its service range extends from 2,000 to 3,200°F. It has a fusion point above P.C.E. Cone 38 (3335°) F. *Plibrico Co.*

51/Circle on Reader's Service Coupon

Back-Up Alarm

Warn-A-Larm, a new gravity actuated mechanical back-up alarm which rings in reverse only, has been announced. The manufacturer recommends it for warehouse fork lift trucks. Designed for easy installation on the rear wheel of trucks, the device sounds a loud, clear warning four times with every revolution of the wheel in reverse. When the vehicle moves forward, striker devices rest almost motionless in special V-nests, but in reverse they strike the rim of the bell. *Warn Sales Co.*

52/Circle on Reader's Service Coupon

Galvanometers

Two new galvanometers—the 2340 Pointer Galvanometer (shown in photo and the 2435 Reflecting Galvanometer—are part of new E-Line of instruments.

Reduced in size and weight from previous units, both instruments also offer two to four times greater sensitivity and are designed for operation in horizontal, vertical or tilted positions. The 2435 consists of a rugged internal-magnet galvanometer system, a 10-inch folded system, and a lamp-and-scale reading device assembled in one compact space-saving unit. Four different interchangeable galvanometer systems are available with periods of four seconds or less and are oil damped to minimize vibration.

The compact 2340 has many applications in education and research where a rugged and sensitive detector is required. Its internal-magnet system permits a change of sensitivities merely by loosening two screws on the top plate. Its new wrap-around clear plastic window provides excellent visibility of scale and pointer over a wide range of viewing angles. *Leeds & Northrup.*

53/Circle on Reader's Service Coupon

NOW... there are 2 Koehring® Dumptors...

Big wide-flared body of the model 100 Dumptor makes an easy target for the sensational new Koehring 205 Skooper. From a "stand-still" position, Skooper makes 5 fast passes with 2-yard bucket, and Dumptor is fully loaded. The full-revolving loader does big bucket digging and loading without the usual drive-in back-out waste motion — and without the high maintenance of skid-turn operation. Skooper's complete digging and loading cycle is: crowd, hoist, swing and dump — then back to digging position — with no traveling.

15-TON...

with 2-way controls, pivoting seat ... 24 mph speeds in both directions for fast, no-turn shuttle hauling ...

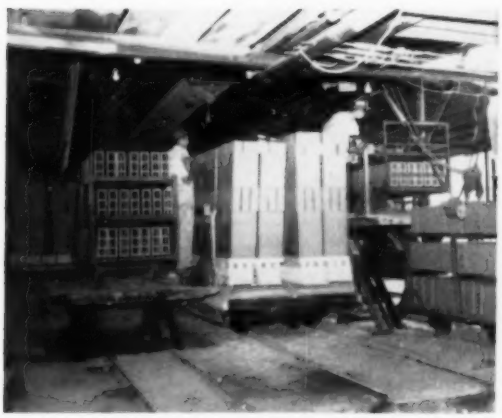
There's no need to turn at the loader, on the haul, or at the dump area with this big 15-ton Dumptor® because it operates with equal ease in either direction. Operator always faces direction of travel —swings around *without leaving seat*. Dual steering wheels, throttle, brake pedals are located at both operating positions of *pivoting seat*. Directional travel and speed-range lever, and dump controls, are centrally located for 2-way operation. Constant-mesh transmission with smooth torque-converter drive gives speeds up to 24 m.p.h. in *both* directions. High or low speed range controlled by easy-acting hydraulic clutches. It hauls up 28½% grades fully loaded—has 30,000-lb. payload capacity—power steering—big-safe, 4-wheel airbrakes, plus parking brake. And that's not all—there are two ways to dump—*instantaneous* gravity, or *controlled* gravity with hydraulic cylinders. See Koehring distributor about it, or send for literature.

KOEHRING
Division of Koehring Co.,
MILWAUKEE 16, WISCONSIN K909

8-TON ... Companion-model 60 Dumptor also offers cost-cutting advantages for your heavy-duty off-road hauling. Smaller in size but just as rugged as the larger Dumptor, it has a ton of strength for every ton of payload capacity — 6 H.P. for every ton of loaded weight. It accelerates fast — climbs 23% grades or ramps fully loaded. Has 3-speed travel in both directions —one-second gravity dump. Get all these advantages on your work—haul with Dumptor.

Minute Money Makers

A practical and quick description of some ideas that may save you much needed time in your operation.



Up We Go

This switch in tunnel kiln setting is practiced at the West Virginia Brick Co., Charleston, W. Va. Instead of the tunnel kiln car moving up and down to correspond with the setter's ease of setting, the setter himself and the dryer car are raised.

The operator controls the rise of the platform by a push button that actuates a hydraulic system. He can always set ware on the cars at table level, making the job much easier.

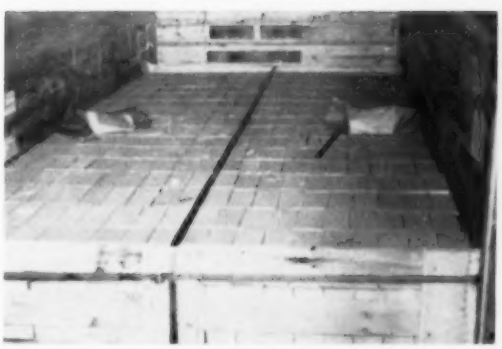
Another innovation is the overhead sander. Note the screen grating over the car. This box contains sand and as each layer of tile is complete, a pull on the cord drops the proper amount of sand on the layer of tile to prevent sticking.

Stabilizing RR Car Loads

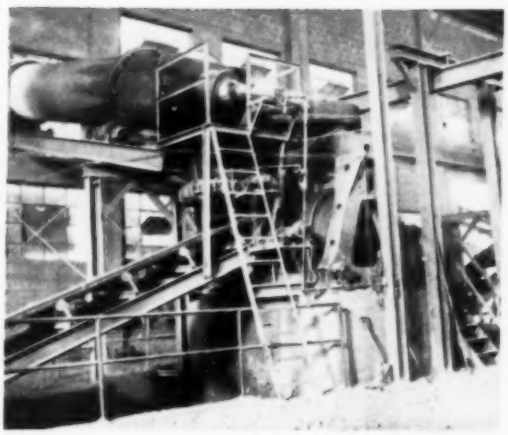
Carloadings of facing tile tend to shift in such a manner that the top layers come forward and form a parallelogram load. This is prevented by crossing the strapping on the sides of the load as shown.

A bulkhead is placed about a foot from the back of the car and the side strapping crossed. The strapping also spans the bulkhead across the car. One strap is placed on the floor and over the top of the load, lengthwise.

A second bulkhead is set against the tile in the door. The straps are then pulled tight and sealed. The load cannot twist and can be termed a "floating load." The entire facing tile industry has had considerable success with this type of carloading.



Minute Money Makers



Rotary Drier

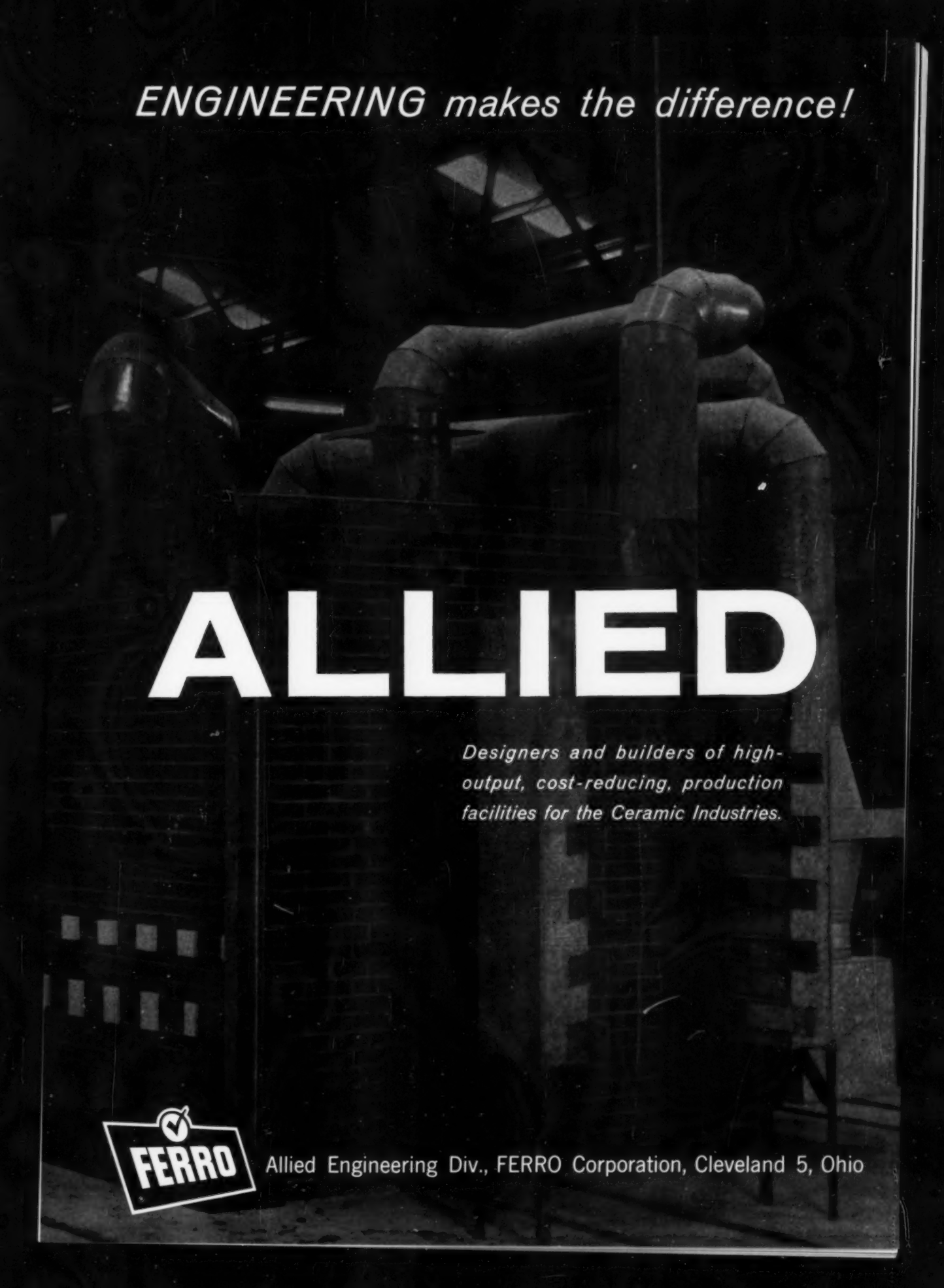
A simple rotary drier set in the return circuit of a grinder screen layout can offer important savings in grinding cost. Usually this location will remove enough moisture to allow the grinder or pan to operate at maximum rates and still reduce the tonnage going through the drier to the point where the drier is not excessive in cost.

Thin Down That Bridge

Here is a successful attempt by Claude Weisman at the Barbourville, W. Va., plant to reduce the bridge and core extender rods in a die.

This brick die with tin cores has a very thin bridge for both sets of core rods. The rods themselves are about ½ inch in diameter. The entire assembly looks rather light but it is strong and does the job fully as well as heavier bridges. In fact, the less iron back of a bridge the easier the extrusion and lessens chance of parting of the clay after extrusion.

Both front and back of die are shown.


ENGINEERING makes the difference!
ALLIED
Designers and builders of high-output, cost-reducing, production facilities for the Ceramic Industries.
FERRO
Allied Engineering Div., FERRO Corporation, Cleveland 5, Ohio

It's A Great Industry

In gathering the information for this refractories issue of BRICK & CLAY RECORD, the editors were not a little surprised at the reactions of some operators and owners of plants in regards to their future.

Many believe that the industry has reached its pinnacle in its production as far as tonnage is concerned. They have the idea that quality in refractories will take care of any future expansions in steel, oil, ceramics, etc., rather than more tons of refractories.

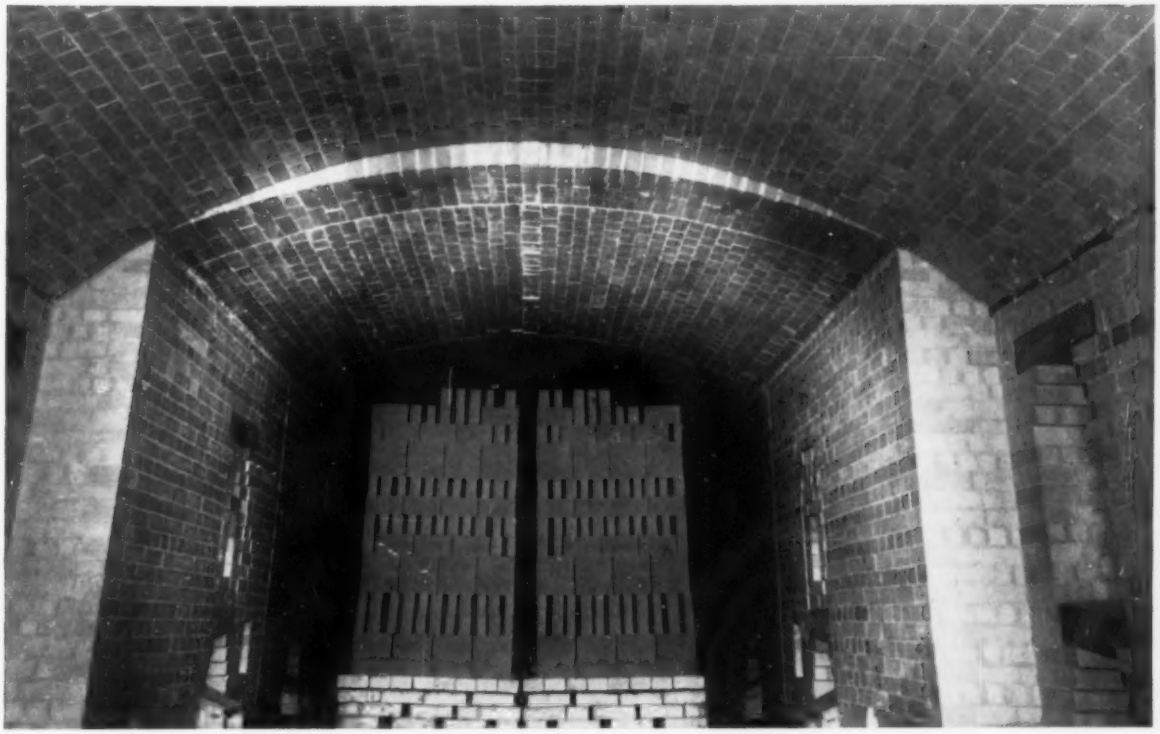
This is an old story to us editors. A prominent refractories producer in 1925 made the same statement about production at that time. The 5,000,000 tons of refractories made in 1925 was supposed to be tops for all times. Yet today more than twice the 5,000,000 tons are made and the quality has improved immeasurably.

A good example of what really happened took place right in our own ceramic field. In the 20's most plants were operating with periodic kilns. The refractories consumed by them was small. The tunnel kiln consumes much more refractories from day to day because it is better maintained and car top maintenance is added.

Even though refractories consumed per ton of steel has gone down, the amount of steel used per person has increased and the population has increased so that the ultimate need for refractories has gone up tremendously. This trend will continue.

As we said, we were surprised at those who discounted growth in the refractories industry. We believe and can justify predicting (see page 41) a faster and bigger growth for refractories in the future than in the past. And we mean tonnage-wise!

Harbison-Walker KAOSIL continues to exceed previous excellent service records



Interior of tunnel kiln showing KAOSIL in the high temperature zone after service of more than a year. The KAOSIL walls, crown and car deck tile remain in perfect condition.

A SEMI-SILICA fireclay refractory of superior quality

...AND THE REASONS ARE CLEAR

- KAOSIL is made with hard-fired siliceous kaolin of exceptional purity by the power-press method which achieves uniform texture—free from laminations—and superior workmanship.
- In the class of semi-silica fireclay brick, KAOSIL is unique because of its high refractoriness which is attributable to its unusual degree of purity with extremely low content of basic oxides.
- The temperature of incipient vitrification of KAOSIL is higher than that of the best aluminous high-duty fireclay brick. This property contributes to its excellent spalling resistance.
- KAOSIL remains rigid and does not become pyroplastic nor shrink in soaking heats up to its temperature limits. KAOSIL does not subside nor sag within its serviceable temperature range up to 2600°F. or higher depending upon pressures imposed.

Some of the applications in which KAOSIL excels are the following: piers under load in soaking heats, in heavily insulated walls and crowns of various ceramic kilns and in many widely diversified industrial furnaces in which advantage can be taken of its unusual properties.

World's Most Complete Refractories Service

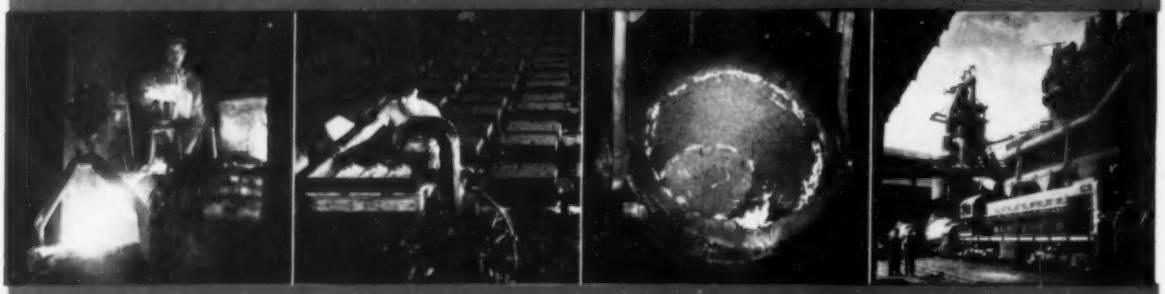
Harbison-Walker Refractories Company

AND SUBSIDIARIES • GENERAL OFFICES: PITTSBURGH 22, PA.

HW 60-5

QUALITY

REFRACTORIES AND INSULATION



...serving the metal producing industry!

GOOSE LAKE FIRE CLAY BRICK AND CLAYS

GROUND FIRE CLAY. A smooth, high quality, plastic fire clay with low shrinkage for laying up fire brick and other fire clay refractories.

FIRE CLAY FLOUR. Extra fine preparation of clay for laying up the brick with tight joints and for molding sand bond.

GRUNDITE BOND CLAY. Special bond clay containing "Illite," a mineral that improves molding sands for malleable and gray iron castings.

FIRE CLAY BRICK. Dense, well-burned plastic fire clay brick for iron and steel ladles, cupolas and for general intermediate heat duty requirements.

FIROX CUPOLA MIX. New type mixture for lining cupolas and ladles by gun or hand application.

CASTABLES. Refractory grog with hydraulic bonds for use as a concrete.

THERM-O-FLAKE HIGH TEMPERATURE VERMICULITE INSULATION

COATING. An insulating cement for application as a plastic on furnace brick-work exposed to temperatures up to 2000°F.

BRICK. Molded vermiculite brick used for back-up insulation. Provides a strong, resilient cushion which absorbs expansion of refractory brick-work without disintegration.

L.B. BLOCK. Pressed block with high insulating efficiency and unusual structural strength for use up to 1900°F.

CONCRETE. A prepared structural material containing vermiculite, Lumnite cement bond and specially selected refractory aggregates.

Chem-Brix CHEMICALLY BONDED—NOT KILN FIRED

CARBON. Chemically bonded Carbon Chem-Brix assure longer service and less spalling, especially for iron and Bessemer steel ladles.

SILICA. New type chemically bonded silica brick with low porosity and greater density than other silica brick. It is more refractory and has excellent expansion properties to insure superior service life.

ILLINOIS CLAY PRODUCTS CO.

Main Office—Barber Building, Joliet, Illinois
Sales Office—208 South LaSalle Street, Chicago 4, Illinois

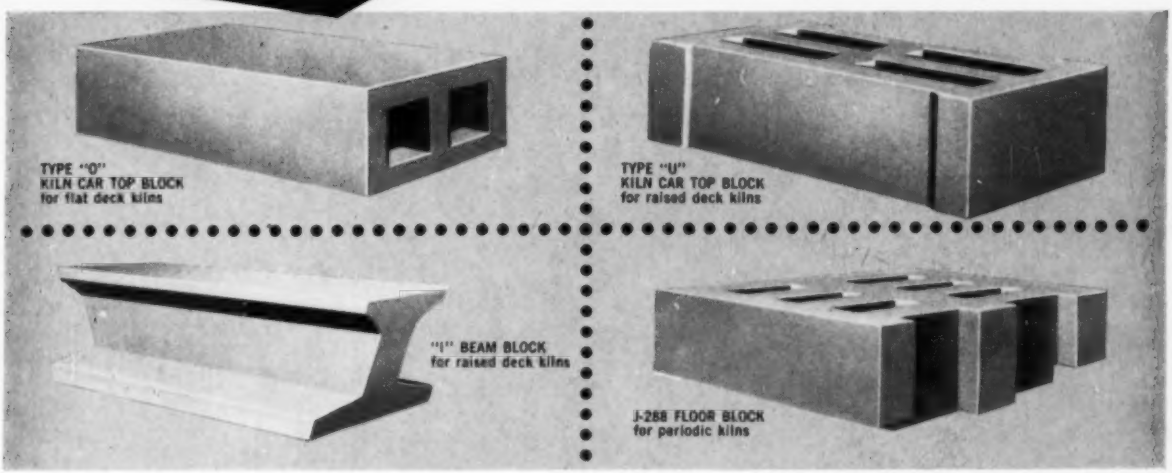
ROBINSON REFRACTORIES

Serve You Best!

New from Robinson!
High-Performance,
Low-Maintenance
KILN CAR and FLOOR BLOCK

It always pays to specify the complete line of Robinson Refractories. Take advantage of modern laboratory production methods, such as instrument-controlled firing, rigid quality control and expert engineering service. The Robinson name is your guarantee of quality. And a distribution system, unsurpassed, makes a complete line of refractories available to you at all times, through fifteen factory branches, in addition to Robinson dealers, strategically located throughout the Northeastern section of the nation.

Write for illustrated Complete-Line Catalog



Robinson Kiln Car and Floor Block are highly refractory . . . non-shrinking and non-spalling . . . have unsurpassed load-bearing properties. Available in a wide range of mixes, including two revolutionary research-developed formulas, designed to combat excessive thermal shock — THERMIX R-119 and R-127. Call the Robinson Branch nearest you. Your Robinson Representative will be glad to help you select the mix best suited to your specific application.

COMPLETE LINE FOR ALL YOUR REFRACTORIES NEEDS...

Fire Brick • Cupola Block • Ladle Lining Castable Refractories • Plastic Fire Brick Acid-Proof Cement • High-Temperature Bonding Mortar • Kiln Floor Block • Kiln Car Top Block

THE ROBINSON CLAY PRODUCT CO.
ESTABLISHED 1836
AKRON • OHIO

OVER 100 YEARS OF Quality and Service EST. 1856

15 ROBINSON BRANCHES TO SERVE YOU BEST

Akron, Ohio • Albany, N. Y. • Baltimore, Md. • Bloomfield, N. J. • Boston, Mass. • Buffalo, N. Y. • Chicago, Ill. East Hartford, Conn. • Indianapolis, Ind. • Mt. Vernon, N. Y. • New York, N. Y. (Jamaica, L. I.) • Philadelphia, Pa. (Pottstown, Pa.) • Rochester, N. Y. • Syracuse, N. Y. • Concord, Ontario, Canada

R-159-42

FACTORIES: Dover, Ohio — Strasburg, Ohio

Have You

HEARD?

Virginia Blue Crystal Kyanite can correct those problems of sagging, shrinkage, spalling, thermal shock, acid resistance, warping, mechanical shock, etc.

Oh, Yes!

It is Quality at its finest.

Virginia Kyanite is closely guarded by a continued research program for new and better methods in quality improvement. Your product is our responsibility, be it ceramics or an allied field. Don't wait, ask now for the latest on Virginia Kyanite and Mullite! Samples, too.

-- FAST SERVICE GUARANTEED --

KYANITE MINING CORPORATION

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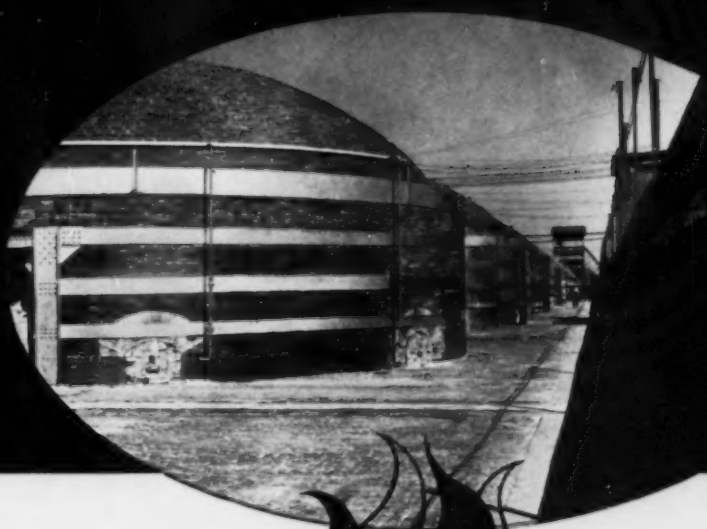
GENERAL REFRACTORIES



For Superior Kiln Refractories

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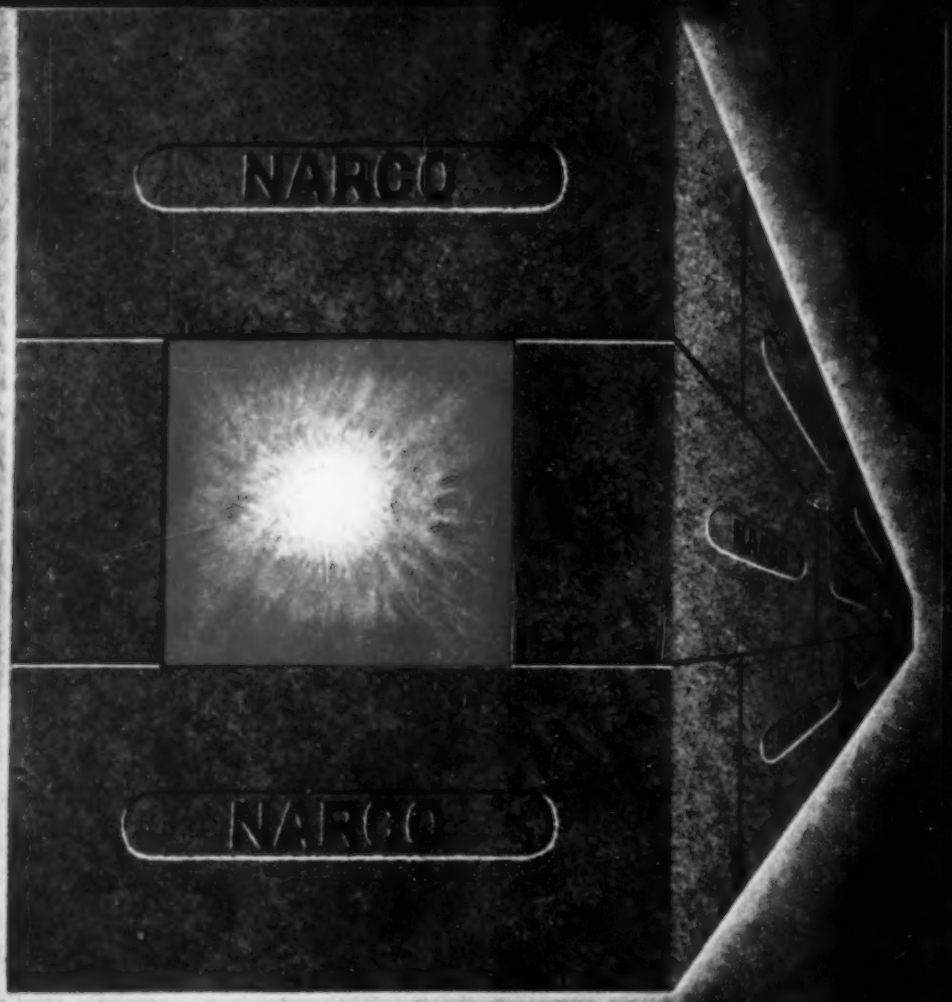

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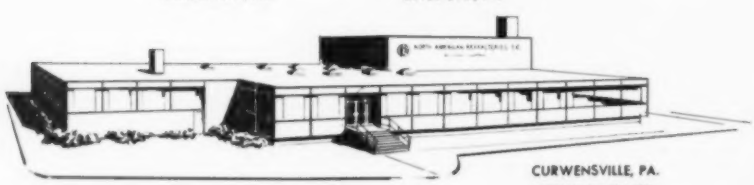

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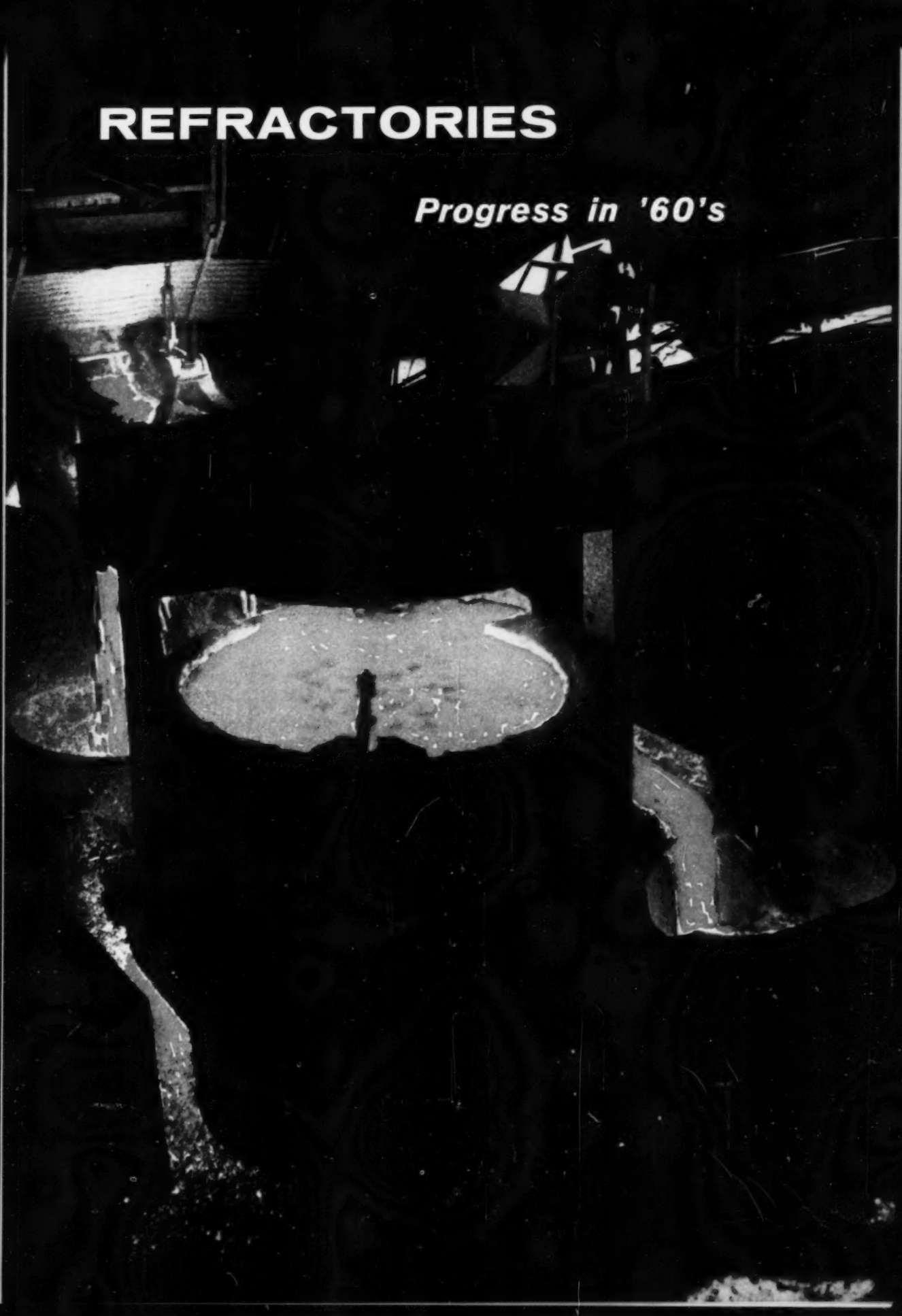
REFRACTORIES

Progress in '60's



60's Refractories Progress

Progress in Refractories is Just Begun

The refractories industry has come through a series of crises which have taxed its resources, know-how, and ability to deliver. It all started with World War II when the industry was called on to supply the refractories for the greatest conflict man has ever known, plus a battle of steel, aluminum and ceramics. A battle of materials which required refractories for their manufacture at unprecedented rates.

The second crisis was the Korean War where again these materials were needed in great quantities, but in addition the refractories industry had to supply refractories for a domestic boom in construction, appliances, communications and rebuilding industry.

Finally, the 50's called on the industry to rebuild America, its roads, homes, factories and machinery. As a result, the three crises left their mark. The industry increased production from 5 million tons of refractories to 10 million tons.

But that is the past, a past well done. Now the industry must look ahead to the 60's and refractories progress in the 60's.

The 60's will reflect the beginning of an explosion of prosperity and expansion in America which will require again the full resources, know-how and ability of the refractories industry. The demands on steel, aluminum, ceramics, oil, power and cement will mount. As pointed out many times by economists, analysts and statisticians, the 60's will require about double the raw and building materials used today. In ceramics alone, it is estimated that the industry will make in the 60's as many stoves, refrigerators, houses, glass, sanitaryware etc., as the industry made in the first 60 years of this century. The rate of production at the peak of the 60's will be 50% greater than production rates in 1959.

All this will need more refractories, possibly at a rate of production which will be 50% greater than 1959. It will mean Progress in refractories in the 60's.

60's Refractories Progress

Progress Spans the Years, the Industries

To those who specify, purchase, sell, manufacture or come in contact with refractories in any other way, BRICK & CLAY RECORD presents here a history of change in the requirements on refractories in the last ten years. The change was significant and here we also show how the refractories industry meet the challenge of change. Finally, we point out how the 60's will affect the progress of the refractories industry. The following topic discussions will be found on the subsequent pages.

Acknowledgment is gratefully given to company officials for their help and advice in assembling this refractories material.

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60's Refractories Progress

Steel Refractories Experience Changes

The most drastic changes in refractories requirements occurred in the steel industry. The speedup of production and the automating of operations play the major roles in stepping up refractories qualities. When steel production exceeds a 90,000,000 ton rate, the steel industry consumes 70% of all refractories made. As recently predicted, the 60's will up the steel demand 50,000,000 tons annually and it will mean more refractories and better ones. This demand alone should account for a 5,000,000 ton increase in annual refractories and production. It is an increase of 30% for refractories.

The steel industry has witnessed some drastic modifications in processing in the last ten years. Along with those changes the requirements on refractories have been altered.

In general, the requirements can be simply enumerated as: 1) The supplying of refractories to ever increasing rigid specifications. 2) The upgrading of temperature requirements. 3) Greater demand for hot load strength and resistance to deformation. 4) Purer composition, less contaminating ingredients, and 5) better firing control in regard to porosity and dimensional accuracy.

Order to Specification

Greater requirements have been made on supplying refractories to specifications. Not only are the steelmakers interested in the general qualities and class of refractories required for specific application, but those refractories must meet both chemical and physical requirements.

For instance, a high alumina brick must have a known and definite alumina content. It must have a minimum contaminant content. Its physical requirements range from hot load deformation time and temperature as well as dimensional accuracy. Its porosity must be accurately controlled.

Temperatures Are Higher

Most processes have required higher temperatures, therefore refractories are now necessarily better in order to hold up under the greater temperatures. The higher temperatures have speeded up the steel making process. Although in some cases where temperatures have remained the same, refractories requirements have been increased to lengthen furnace life. In other cases, in spite of higher temperatures, the effect on the refractories has actually eased.

An example of the latter case is the L. D. vessel or oxygen converter. The temperatures attained in it are high but because the heat is localized, the effect on the refractories is actually less severe. The quality of the refractories has not been reduced however.

Deformation a Problem

Steel men are constantly emphasizing this requirement of refractories to resist deformation under load. This has been a sore point with many interviewed. Many furnace failures begin with the distoration of the brick or shape under the hot load. Once a distortion occurs, the entire furnace moves and real damage can then begin, such as spalling, erosion, cracking, etc.

Perhaps a better choice of raw materials or a better control of blending can be very helpful. Contaminating ingredients, especially the alkalis, are a great deterrent on this score.

Control the Contaminating Oxides

It was shown in one examination that three high alumina brick supplied to certain high specifications meet the written requirements. Two of the brick passed the test while the third failed. Failure was due to a much higher KNaO content in the clay portion of the brick. Alkalis contribute to failures that are in this case contaments.

This is true in mullites and sillimanite refractories too. Silica and alumina may be undesirable as well as any alkalis. In silica brick, alumina and alkalis are contaminants.

Basic brick resistance to deformation and measure of

life may be dependent on the magnesia content to a certain point. In these refractories calcium oxide, silica and alumina are contaminents.

Therefore, raw materials must be cleaner, better controlled and handled through the process of manufacturing into brick so that they do not become contaminated.

Precise Manufacturing

Much of the wear on refractories has been reduced through better masonry jobs and they in turn are better because of the great accuracy in dimensions of most refractories. The requirements on this score have been tightened up considerably. Prefiring of raw materials for brick making has contributed a great deal to this accuracy.

The degree to which refractories are found has also played an important part in upgrading the life of furnaces. There cannot be any shrinkage or at least it must be at a minimum after installation of refractories in a furnace. This requirement has been tightened. It requires the firing of some refractories to cone 23. This also means that the porosity can be lowered. The danger of refractories being floated and blocking the tap hole is minimized. Absorption as low as 5% are being required.

Higher Blast Furnace Temperatures

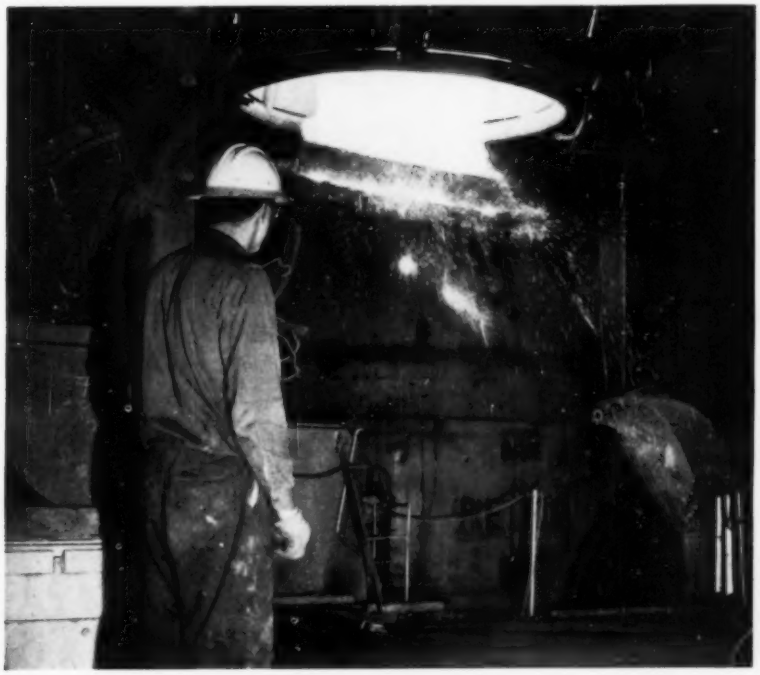
It has been found that higher temperatures produce steel faster in the blast furnace. It has also been found that when pellets of Laconite are used, more heat and more intense firing is necessary. This has raised the temperature requirements for all blast furnaces' refractories. The upgrading applied to stove refractories as well.

Blast furnace tonnage is being increased by increasing the pressure and temperature. This means new consideration for super refractories if the present long campaigns are to continue. Nearly all types of super duty clays have been tried ranging from raw clay mixes to high calcined products fired to cone 18, cone 20 and even cone 23. The results in some cases were very poor until special precautions were taken to minimize thermal fluctuations. The quality and quantity of super duty clays are fast becoming extinct. One future possibility for future blast furnace and stove linings, checkers, etc. is synthetic mullite.

This raw material is available in unlimited quantities. The chemical and physical properties of the mullite brick are outstanding. At present several trial installations are now in progress. Presently a large Eastern steel mill will have two stoves with mullite in the top checkers, stove dome, and upper skin wall and combustion chamber. Many blast furnace linings are being laid up with mullite type mortars. In the future many blast furnace operations are going to turn to synthetic mullite to insure the long refractory life of blast furnaces and blast furnace stoves under severe operating conditions.

The use of carbon hearths will continue to be used. There is a limit to the extent the carbon can be extended into the stack.

Upgrading refractories to increase life was a must since refractories costs in place today are six times the cost of the refractories in place in 1940. The furnace must produce four million tons of steel.



Research conducted by the Steel industry has developed new methods of steel production based mainly on higher temperatures and more vigorous processes. These factors impose operating conditions of great severity on any refractory.

The open hearth furnace has increased in size during the past ten years with the increase having a definite bearing on the need for better refractories.

The pressure has been put on the open hearth to match the product and economy of the oxygen converters. Oxygen is being applied to the open hearth by a lance through the roof. This speeds up the reactions and increases the erosion on the silica roofs. In order to increase the roof life many operators are installing basic roofs. There are about 200 furnaces out of 920 open hearths with basic roofs. More will be converted soon as additional oxygen capacity is installed. The design and techniques of installation will do more to make the basic roof successful than did anything else. The brick compositions were standard for several years before they were applied to a basic roof in the manner which has worked so successfully.

As more people concentrate on this problem new and better designs will be developed. The best design will be relatively inexpensive, simple and easily installed and replaced, plus having a means to keep the roof clean, and cool critical areas to balance out wear patters.

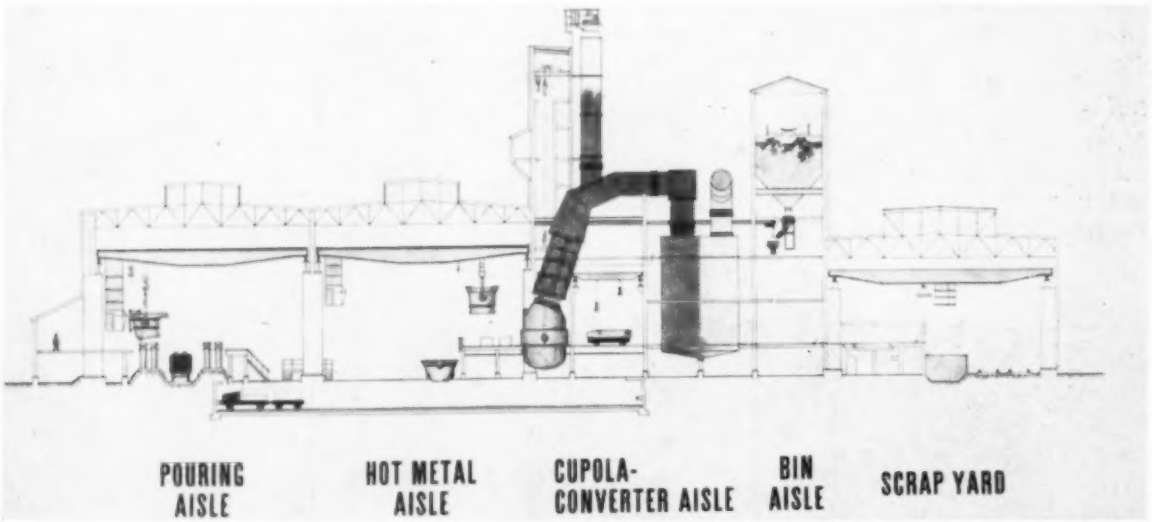
ical presses are used to produce a very dense grain without sacrificing the chemical properties. The only sure way to get uniform quality is to have control over the raw materials source. This insures a steady uniform high quality raw material.

The use of suspension as a method to install open hearth refractories is generally accepted as sound refractory practice. Most suspended arch and wall patents have run out. Most refractory companies are not so interested in selling a design, but in selling refractory products. Many arch and wall type shapes are being sold direct to the consumer.

Cone 23 brick has been requested for the bottoms which reduce the shrinkage in place and the porosity. In turn, the possibility of floating is reduced.

The electrically cast refractory is a comer in the open hearth. Trials have been made and proved successful as far as the product is concerned. The cost is still a problem.

A question has been put to the editor at every steel plant interviewed involving the use of the open hearth. "Is the open hearth destined for the scrap heap as the Bessimer



Oxygen Converter arrangement

Checker temperatures are increasing. Specific refractories are being made for checker brick, which incorporates low porosity and high load bearing properties of elevated temperatures. In more severe conditions basic brick are being used as checkers. The results of basic checkers has not been too successful, but development work is under way to produce basic checkers which will not crack in service, stay relatively clean and can be reset. It appears that it will take a special type of bond in order to produce a brick which will perform satisfactorily at the temperature encountered in open hearth checkers.

The present trend in basic refractories is to higher pure magnesite. In order to produce a good physical grain additives are used. Most of these have a detrimental effect of the chemical resistivity to the magnesite.

Processes are being developed to produce a very high purity magnesite grain in a commercial basis. Unwanted impurities are not added to produce the physical conditions of the grain. High temperature kilns and mechan-

converter was discarded?" Not in our life time. But it will be replaced in many installations by the new oxygen converter. Ninety per cent of all steel still passes through an open hearth.

Pouring Pit Refractories Get Mention

More attention is being paid to better pouring pit practice. Pouring pit refractories will be made closer to the source of consumption. Bad ladle practice lessens the advantages of having a superior product. Universal linings are being used by many shops to simplify the installation. These linings can be laid up faster without sacrificing workmanship.

Mold and stool coatings of refractory materials are being used to increase ingot quality and decrease rejections

Oxygen Makes its Appearance

The most modern steel melting unit is the oxygen converter, sometimes referred to as the L-D Vessel. This piece of equipment makes all grades of open hearth steel

faster and more economically. In 1965 about 40 million tons of steel will be produced in these units. All types of basic linings have been tried. The most economical has been tar bonded dolomite. Storage of these bricks are critical. The shelf life varies from two to three weeks.

Since storage is a major problem. most oxygen furnace operations will have a nearby source for their refractory materials.

Development is being conducted by the various refractory suppliers to come up with a superior product. Most of these are more expensive in the initial cost and the service life has not been great enough to justify the added cost. It appears that the cheapest basic raw material when combined with tar does a very satisfactory job. It is certain that many approaches will be tried during the next year in order to develop the most economical and satisfactory lining practice.

However, the extreme heat is localized so that the furnace lining is subjected to less severe conditions than in either the Bessimer, open hearth or electric furnace.

This would indicate a letup on refractories requirements. But such is not the case. Operators have maintained the requirements at a high level even requiring better refractories. The added quality was greater insurance to longer life.

The Oxygen Vessels operation consumes about 30 lbs. of refractories per ton of steel which is considerably lower than the open hearth. The lower heat requirement in this furnace make the need for basic roofs questionable.

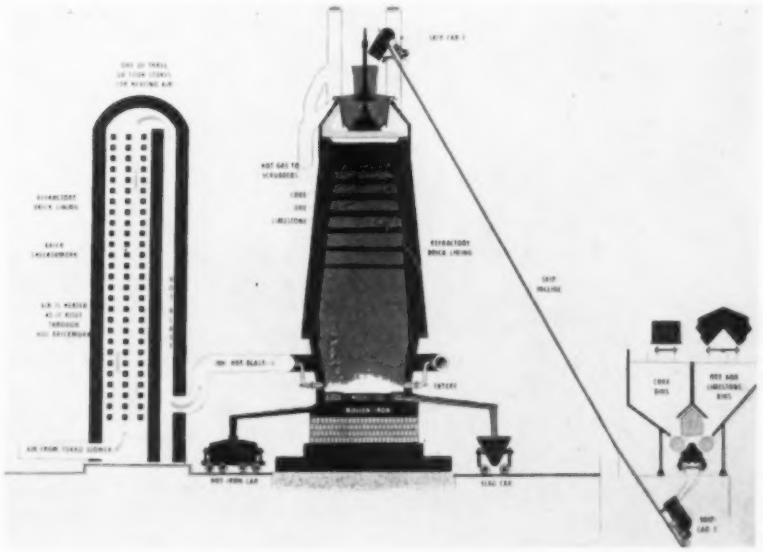
Other Furnaces are Small Producers

Both the electric furnace and the Bessimer converters are small producers. Three per cent of the steel is Bessimer steel and seven per cent is electric furnace steel.

Ladle brick requirements have not changed greatly in the past ten years. There is some use of chemically bonded brick in ladles which performs well.

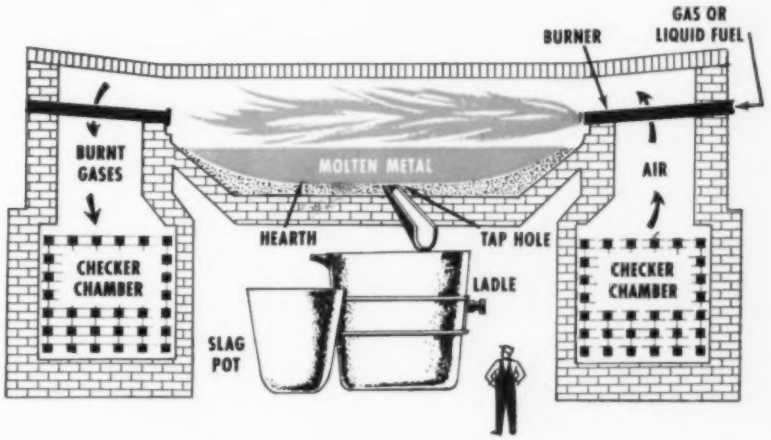
There is no major change in coke ovens. There is a trend to cast door linings rather than using preformed shapes.

Diagram of glass tank . . . Reduction of glass defects has been one result of research in glass refractories.



The blast furnace, primary method of iron manufacture confronts refractories with several severe conditions. High heat, corrosive atmosphere, and severe abrasion require refractories of high quality.

Recent developments in the open hearth method of steel production have revolutionized types of refractory products used in this method.



60's Refractories Progress

Tunnel Kiln Requirements Move up Constantly

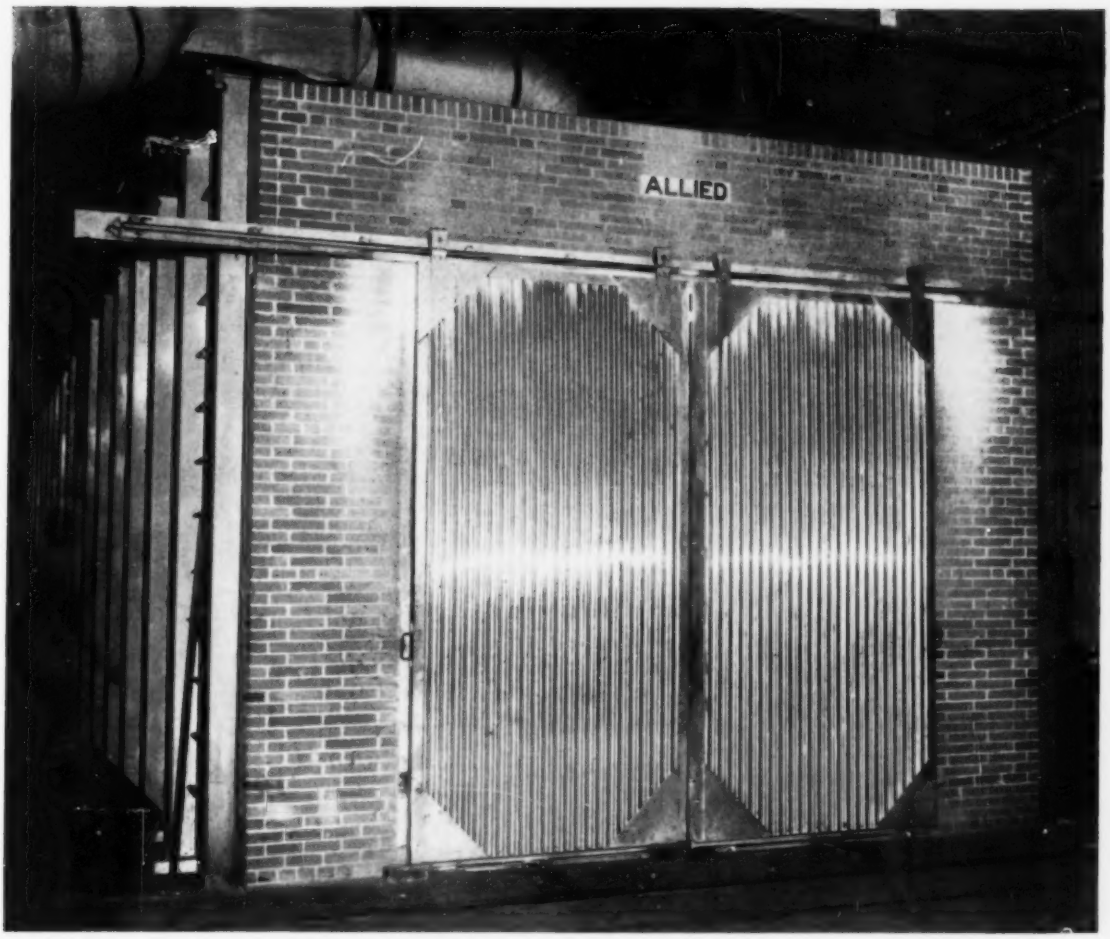
Kiln builders here have been faced with a double problem in the 50's. One problem involved the improving of the kiln from the refractories standpoint because of increasing firing temperatures. Secondly the industry has been called upon to build nearly 200 kilns per year. Both problems will be with them in the 60's. Since production will increase, possibly by 50%, thousands of new kilns will be added and replaced in the coming 20 years. Add to these two new industries which must be supplied with kilns, the electronic industry and the lightweight clay block industry.

Mechanical aids such as this kiln car pusher have lightened the load on the plant worker and allowed ever increasing loads and methods.

Since 1950, Allied Engineers have been increasing the use of monolithic construction in their design. This is accomplished by the use of both refactory ramming mixes and castables. The use of basic and acid (silica) refractories in tunnel kiln construction has greatly increased because of their stability at elevated temperatures. This same thing applies further in the use of Alumina. Zirconia and other refractories.

Speed has affected setters and saggers which are constantly being improved to withstand elevated temperatures and faster cycles. Open firing has increased with the increase of gas as a fuel. This required an improvement and greater use of open setters, racks and pins.

In recent years the tendency of refractory users has been toward higher and still higher temperatures. Now a 3000°F temperature can practically be called common. The 3000 to 3500°F range is attainable to the point of being called common with the use of some special firing equipment. A temperature of 4600°F is now available using a fused zirconia



Tunnel Kilns capable of better temperature control, sharper gradient and better zone divisions have been developed to meet modern manufacturing needs.

refractory and a mixture of acetylene and oxygen as fuel. The temperatures required will still go higher and where the temperature limit of present commonly known fuels is reached. other fuels and methods of reaching higher temperatures are available.

Refractories Keep Pace

The refractory industry has kept pace with the increase of temperature requirements by controlling grain size to increase spalling resistance where rapid heating and cooling of refractories is required along with the development of higher temperature materials.

Insulating castables and insulating firebrick also have increased refractories along with increased resistance to flame abrasion and can be subjected to uses which were only hoped for ten years ago.

The refractories industry has been and probably will continue to be selling in a buyers' market which will demand near perfect quality, uniformity of product and sizing. This situation has created the need for closer control of all drying and firing conditions in the refractory industry.

Sewer Pipe kilns have brought out new and improved deck construction and design. The Tunnel Kiln, Dryer and Special Kiln Builder has also kept pace with this demand.

Tunnel Kilns for refractories have been constantly refined to operate within closer limits to produce the desired product economically. Improved recirculation and application of the newest type of burner equipment in the exhaust and preheating sections of the kiln produce a uniform temperature gradient through out the setting to reduce cracking and distortion.

High Temperature Kilns

Special High Temperature Kilns for Production Research and Laboratory use have been built and are program controlled permitting unattended operation after starting. Periodic kilns are being fired with program temperature control to control both heating up and cooling cycle where desired.

60's Refractories Progress

New Refractories Look to 60's For Development

Single and double oxide, carbide and nitride refractories are gaining in application and the 60's should see this trend grow. More refractories manufacturers are expanding into the manufacture of these, possibly faster than their application develops. It is expected that the annual volume will grow from $15,000,000 to $30,000,000 in the 60's.

As new products in the ceramic field are developed, and modifications are made in existing processes, the tendency is generally toward higher firing temperatures. Occasionally, these changes push the firing temperatures above the upper limits of usefulness of conventional refractory materials.

When this occurs, the use of refractory silicon carbide or aluminum oxide may be indicated. Successful use of these high temperature refractory materials depends upon their proper application. In using silicon carbide, for example, the ware in ceramic manufacturing must be perfectly dry as it enters the kiln. If there is moisture present in the ware, it will be removed in the heat of the kiln but the moisture as it is removed will react with the silicon carbide, oxidizing it. Properly used, however, silicon carbide furniture is long lasting at temperatures above the upper limit for conventional refractory materials.

These high temperature refractories were introduced to the industrial scene less than 50 years ago and, in light of later developments, inappropriately named "super refractories". Apart from unusual properties, there were indications that these materials consisting of bonded silicon carbide, fused alumina and electric furnace mullite might offer a high degree of formability. This was soon confirmed.

SIC in Complicated Shapes

Interim improvements to equipment, production and handling techniques and product compositions have broadened the range of shapes that can be manufactured, of which those pictured are typical. More configurations can be expected if a projection of past experience is any criterion.

Super refractory shapes also are employed in many different types of furnaces and kilns to replace brick or heavy-section units of naturally-occurring minerals. Here they effect increased work area, lowered heat capacity, decreased weight and improved operating efficiency.

As parts in processing equipment such as pumps, chutes, generators, venturis etc., these special shapes may be used as a substitute for metals. The super refractory at times is mated with metal to satisfy the requirement of a particular unit.

Where gaseous atmospheres are involved, lining shapes can be made with various designs of interlocking joints to help prevent leakage.

Special Silicone Carbide parts such as pump, chutes, generators, ventures etc., act as substitute for metals.

Linings and chutes of silicone carbide for extremely difficult heat, gas, and abrasive conditions.

Aluminum oxide is used to best advantage in the construction of the kiln itself. In the shape of bricks and muffles, it provides far greater life in areas where failure of materials would prove very costly in terms of down time and ruined production. Aluminum oxide is chemically stable in normal kiln atmosphere. It is not recommended for kiln car furniture, however, because for equivalent strength, it must be heavier than silicon carbide. It also requires more heat input to bring it up to firing temperature of the ware.

In many ceramic fields, the high temperatures required are too hot even for silicon carbide and aluminum oxide. Above 3000°F. a very pure form of aluminum oxide will be required to withstand temperatures up to about 3500°F. In the range from 3500°F. to 4000°F., magnesium oxide bricks and shapes are required. Zirconia brick protects up to 4300°F., and for higher temperatures, up to about 5200°F., brick of thoria are necessary.

The properties of oxide materials for refractory uses have been published and are readily available in the literature.

Motor and machine parts will operate under severe heat and abrasive condition.

Properties of Alumina

The use of ALUNDUM refractories in high temperature furnaces is well known. Alumina has been used to construct Cone 35 (3200°F.) kilns over the years. However, more interest has developed in high temperature applications in the past few years. As a result many commercial Cone 35 kilns have come into use.

Another use for alumina is in the form of tubes which are wound with molybdenum or tungsten. They have been used for firing special alumina bodies and sintering moly or other refractory metal compacts or carbides at temperatures up to 3300°F. in hydrogen atmospheres.

Experimental air heaters have been designed to heat air to 3000°F. This is accomplished by heating a pebble bed to 3200°F. and then pressurizing the vessel to force air through the preheated pebbles. Sizes have ranged from 8 inches to 28 inches internal diameter. The high velocity air has been used to test aerodynamic surfaces and materials at speeds of Mach 2 or 3.

High temperature chemical process furnaces have also been designed for reforming gases. They operate at temperatures of 2600°F.-3200°F.

A recent development has been the construction of an annealing furnace to operate with a dry hydrogen atmosphere. The dew point of the hydrogen is about −50°F. Insulating brick of high purity alumina has successfully contained the hydrogen without raising the dew point. This furnace is in continuous operation. The upper limit of use for refractories is about 3200°F. However, under optimum conditions it may satisfactorily serve to 3300°F.

A recent development with us has been a fused magnesia-alumina spinel. This spinel has a higher melting point than alumina, by about 200°F. or 3800°F. It is similar to alumina in thermal expansion and thermal conductivity. With a density of about 3.57 it more nearly resembles magnesia. It has excellent load bearing properties. Another interesting feature is that it is non reactive with ferrite materials. Shapes made of this magnesia-alumina spinel have been successfully used at 3400°F. This material is expected to operate at temperatures 200-300°F. higher than alumina. It is so new that all properties have not been determined. Work is proceeding on gathering this data and the report will be published in the near future.

Zirconia for 4000° Temperatures

The next step in the quest for higher temperatures is zirconia, which can be used up to 4300°F. In most applications to date temperatures have ranged from 3450 to 4000°F. There are several kilns in use mostly in laboratory development work.

Of particular interest is a zirconia lined furnace used to sinter tungsten powdered metal compacts and shapes. It operates in a 70% argon and 30% hydrogen atmosphere. Heat is supplied by moly heating elements. The furnace operates at 3450°F. which is just above the limits for ALUNDUM refractories. There is a slight problem of insulating the moly elements from the zirconia. At this temperature zirconia becomes a conductor and will act as the heating source if proper contact is made to the electrical supply.

With all the interest in the missile and re-entry problem, test conditions were desired which would simulate speeds at Mach 7 or 8, or even Mach 10. The most logical solution was to line the 3000°F. air heaters with zirconia rather than alumina. This was done and the furnace operates at 4000°F. with proper pressurization and nozzle construction speeds of Mach 8 or 9 are possible. One small unit of this type operated for more than 9 months. It was cycled twice a day from 3000°F. to 4000°F. This was an 8″ diameter unit. Others have been built with diameters up to 28″. One, under consideration now, will be 9 feet internal diameter.

In the chemical processing industry a zirconia lined furnace has made acetylene for over 100 days at temperatures in excess of 3600°F. The lining was still in excellent condition at the end of the run.

60's Refractories Progress

Glass Tanks Live Longer

The refractories industry was called on to meet drastically changing conditions in the glass industry. Production of furnaces was increased by a 50% which required a 200 to 300° increase in temperature. This change in demand on refractories was successfully met by the refractories industry. In fact the life of the furnace was actually increased in spite of having to modify refractories to meet the changing conditions. The glass tank today is almost completely changed and yet performs a much more satisfactory job for the glass industry, both flat glass and container glass ware.

What lies ahead for this use of refractories in the 60's can already be anticipated. Glass producers are looking forward to smaller tanks but faster producing tanks since one school of thought wants many glass tanks near markets supplying only a limited area market. The other school of thought in glass tank design is a trend to much larger tanks, particularly for container manufacturing. Therefore the 60's will see tank design go into two directions, but in each case the life of the tank must be grossly increased because temperature and production will increase further.

Next to steel furnaces, the glass tank has gone through a revision during the 50's which has resulted in a considerable increase in tank life, an upgrading of refractories and a decided increase in daily tank output of molten glass.

Most tanks in the early 50's operated at a rate of a ton of glass produced for every 5 square feet of surface area or more. Now most tanks produce a ton of glass or less than 5 sq. ft. This was a 20% or better increase in tank production.

The increased production involved an increase in operating temperatures. The higher temperatures affected refractories so that the life of the tank was drastically reduced.

The refractories industry was called upon to solve the problem. Not only was the industry asked to supply refractories to meet the higher temperature and yet maintain the life of the tank, but it was asked to upgrade the refractories so that life would actually be increased.

Pavers for Tank Bottoms

The tank bottom was one of the really vulnerable spots. Hotter glass meant great glass movement near the bottom block and consequently greater and faster erosion, and more glass contamination.

The standard flux block used in the bottom required attention. The first change was an alteration of the flux block composition to a premium flux block. It was a good first step and one which still satisfies many glass makers. It increased bottom life from 50% to 100%.

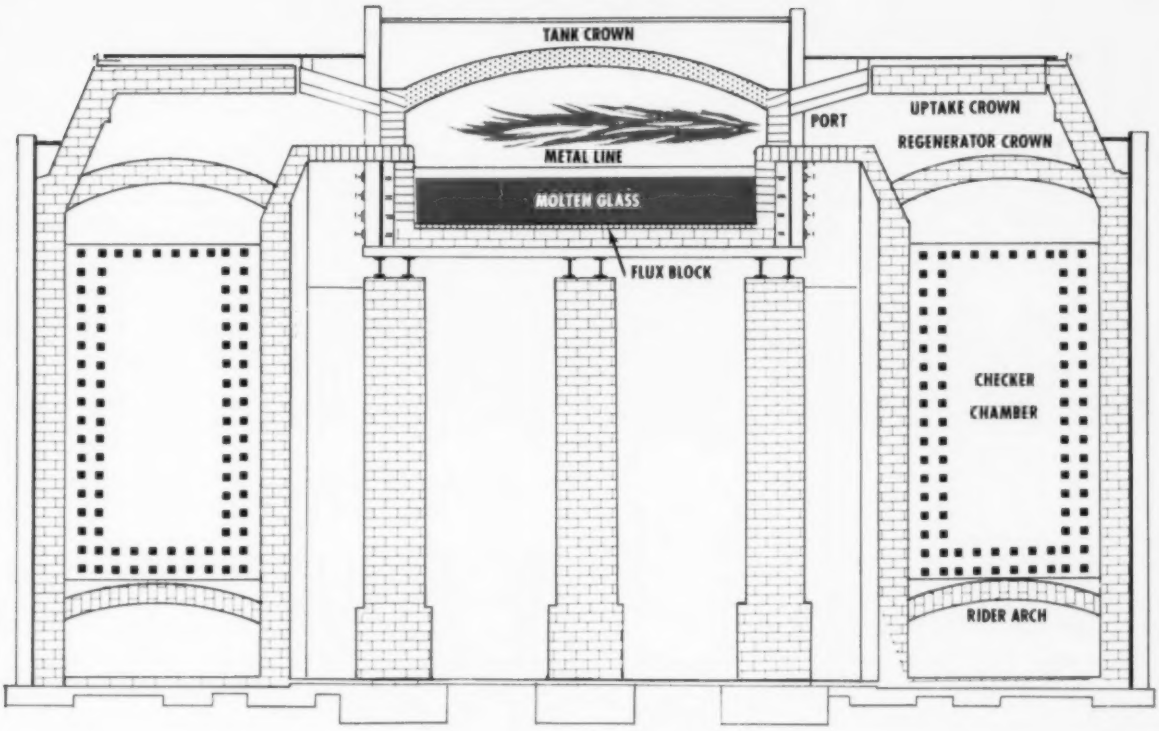
The next step in bottom improvement involved the development of an electrically cast paver. The paver was layed over standard bottoms or the premium bottom block. This resulted in another increase in tank bottom life. Today, paver construction is just about standard construction for tank bottoms.

Another Paver Appears

Another type of paver appeared sometime later which was the Zirconia paver. It was practical and in many cases preferred over the electrically cast paver. Heat transmission and coefficient of expansion were the factor involved. So today both type pavers are used with the zircon paver having a slight edge.

The first change from the standard flux blocks for tank side walls was a change to the premium type block.

Diagram of glass tank



However, this did not last too long and the electrically cast block came into the picture. As of today opinion is still divided and preference divided between the premium type flux block and the electrically cast block. However, the cast block is coming on rapidly. Here again the question comes up as to heat dissipation and fuel economy. Longer life is desired because the rate of pull on the tank has been increased and this required a higher premium block.

The tuck stones and the brest walls normally have gone to sillimanite and mullite type of refractories. These proved to be very satisfactory in lengthening the life of the tank and are in majority use today. The electrically cast block has come into the picture but its use is not wide spread as yet, The tuck stone, of course, remains sillimanite or mullite. The brest wall is in hot spots going over to the electrically cast block.

Crown is Improved

The normal construction in glass tanks is for a silica crown. However, in recent years the super duty silica brick with low alumina content has been used.

The regenerator boxes have gone to super-duty refractories in the beginning and are now moving to mullite and to basic refractories. This is spreading into crowns as well as walls. The checkers are going toward basic because of their longer life. Some installations through the industry are a combination of silica and basic in the walls of regenerators. There is still no definite pattern but there are many trials in all directions.

Castables Are Used

Castables are being used today for tunnels from regenerator to the stack. This type of refractory lends itself to the tunnel construction and therefore is highly satisfactory.

In general, it was necessary to increase the life of the tank from one and a half to two year life to three and a half or better. It was necessary because the rate of glass production from the tank was increased and therefore temperatures increased. The refractory industry has improved its refractories and accomplished the needs of the glass industry.

There is also a trend to deeper furnaces. This combined with the smaller furnace means that quicker changes can be made for colors if necessary and easier handling for shut downs. These smaller furnaces also are planned to be end fired.

The industry as a whole is faced with considerable supply of refractories. For instance, foreign expansion in flat glass involves the Philippines, East Africa, Venezuela, Columbia, Formosa and Japan.

In the United States furnaces are planned for Nashville, and one for Canada. As far as container glass furnaces at the present time, one will be built in Nigeria and one in Western Australia.

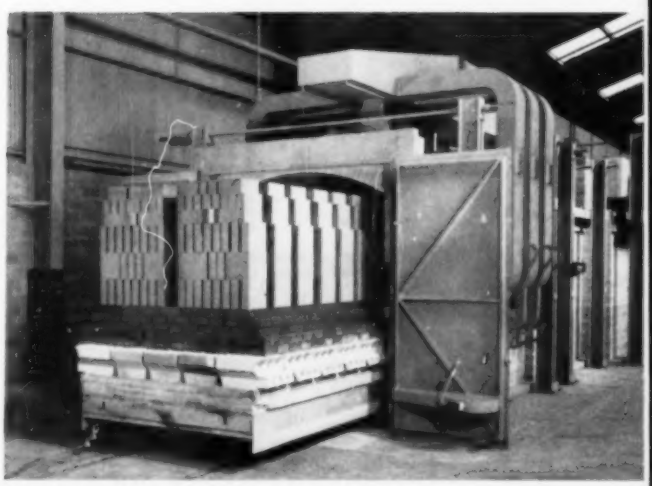
Insulation Still A Problem

Several plants have been thinking about insulating tanks. This is a tricky problem and one that needs careful study and insulation application. Questions involved in insulation are the desirability of running furnace hotter or colder as desired. Also, to determine when is the proper time to insulate. No set rules have been developed for it and no two operators are in agreement.

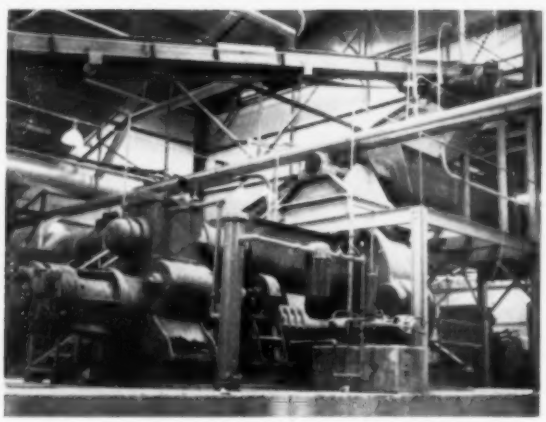
How Plant Operations

60's Refractories Progress

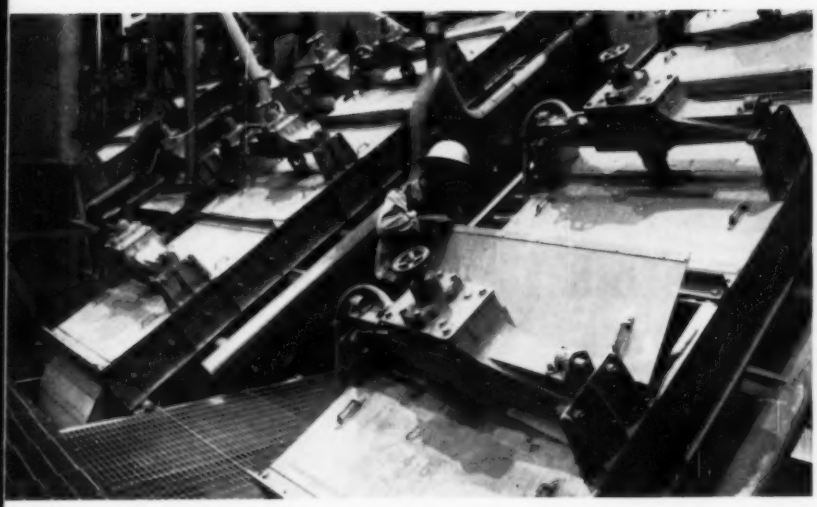
The refractory industry has been a pioneer in the field of tunnel kilns. Here at a new Harbison-Walker plant the special requirements of the industry are illustrated with a tunnel kiln that is capable of reaching exceptionally high temperatures along with accurate controls and large capacities. Only a few fields make such demands on the tunnel kiln designer.



New products require new packages to allow shipment and storage by the consumer. Here at The Robinson Clay Products Company's plant at Dover, Ohio plastisol lined containers are used to contain a corrosive refractory product. As research and new customer requirements cause new products to be developed many problems unfor-seen at the time of original conception must be met and solves.



Stiff mud process have been a favorite method of producing fire brick and will continue to produce quality products for many years to come. During the sixties many more heavy duty installations featuring higher power inputs and high production rates can be expected.

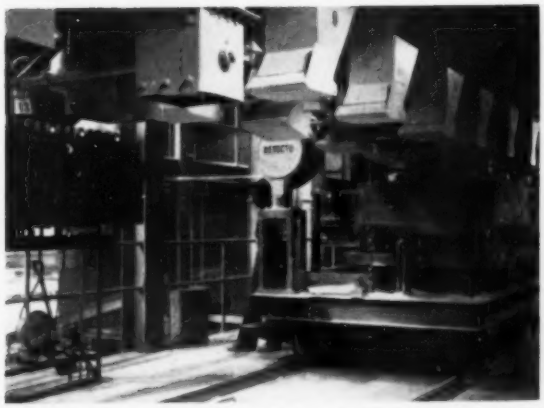


Far left . . . Grog use is on the increase in the manufacture of refractories and the demand for materials of higher heat resistance has increased the use of dead burned, calcined or prefired materials many times. The rotary kiln, an economical method of getting these desired stable materials, will be increasingly important during the sixties as ever growing tonnage of materials will be heat treated prior to use in the end product.

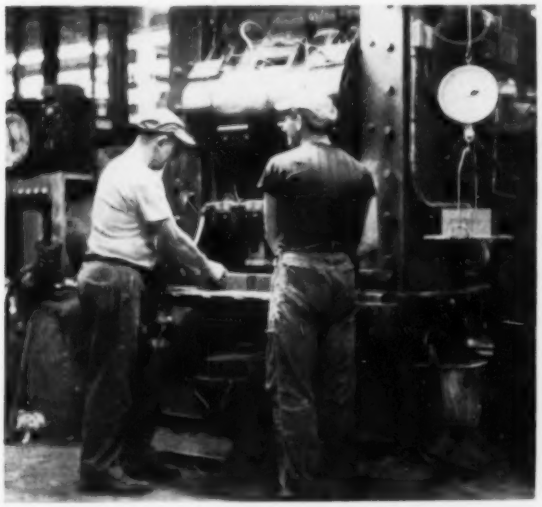
Left . . . Grain sizing is controlled with a screening system and here at Kaiser's Columbiana plant the use of heated-vibrated screens with a dust collection system illustrate the recent developments in this important phase of refractory manufacture.

Have Improved

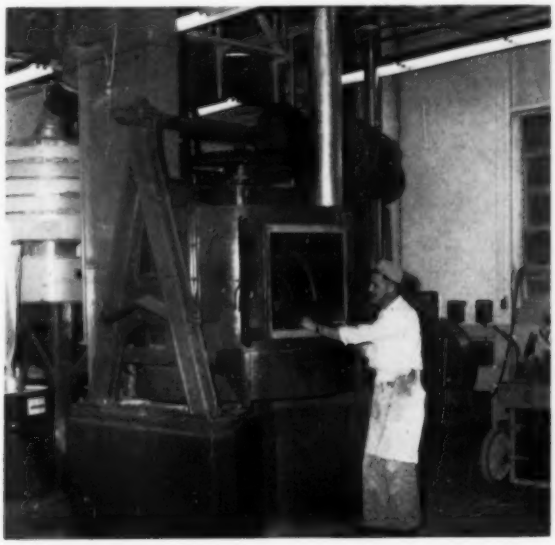
The constant changes in plant operations, both in methods and equipment is a sign that the refractories industry is moving ahead. Pictured here are a few of the many modern plants that have been constucted by a resurrgent industry over the past few years.



Modern batching, represented by this installation at Noth North American's Farber plant results from the need to blend many different materials to form the final product.



The dry press has been one of the standard methods of refractory manufacture for over half a century and will continue to be the primary method for production. Here at the E. J. Lavino Co's plant at Plymouth Meeting, Pa. offbearers remove highly abrasive basic brick from the press, one that has been equipped with the ultimate in mold boxes highly wear resistant mold boxes made with tungsten carbide liners. With the use of non-plastic raw materials and need for more uniform products pressing promises to continue to be an important method of production.



Grinding with a laboratory sized dry-pan the Technician at the Garber Research center prepares a batch of material for further testing.

60's Refractories Progress

Refractories Consumption to Grow Steadily

The Outlook for Refractories is a bright one and will follow very closely the trends in steel. All refractories users, ceramics, oil, power, etc. will parallel steel trends. Therefore, from the following tables we make two assumptions.

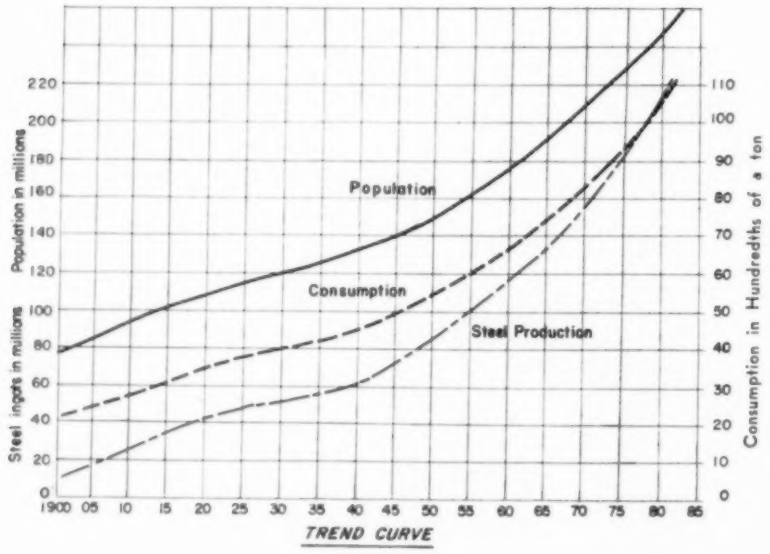
1) That the refractories industry will produce at a rate of 50% greater than 1959—to meet future conditions.

2) That it will produce as much refractories in the next score of years as it produced in the first 60 years of this century.*

In tracing the history of refractories, it will be noted that in 1925 production was at 5,000,000 T and mostly brick and shapes. Today production is over 10,000,000 T in brick, shapes and (the plastic-ram-and castable group). There is no reason to believe that production will not expand at the same rate or faster than in the past 35 years.

YEAR	Population (000,000)	Steel Ingot Production (000,000)	Steel Consumed Per Person (in Hundredths of a Ton)
1900	76	10	13
1905	84	20	24
1910	92	26	28
1915	101	32	32
1920	106	42	40
1925	116	45	39
1930	123	40	33
1935	127	34	27
1940	132	60	45
1945	140	71	50
1950	152	86	57
1955	165	165	64
1960	175	118	65
1965	190	136	74
1970	208	158	82
1975	228	185	92
1980	248	200	105

*(Total output of steel ingots for 60 years was close to 3,600,000,000 T. In the next score production should be 3,700,000,000 T).



60's Refractories Progress

Refractories Executives Optimistic But Sound Warning

It becomes quite clear after reading the following statements of the executives of this industry that there is a major preparation of staffs, operations, plants, research and promotion for an unprecedented surge in the demand for refractories. They realize that preparation is the key to later success. According to Brick and Clay Record's statistical research department, peak business in the next score of years should be up 50% over the previous decade. This will require more people, plants and equipment in the refractories industry.

Harbison Walker Readies Plants and Products for 60's

E. A. Garber
President

In anticipation of the expected boom years of the 1960's the refractories industry has been building new plant and research facilities, entering new production and research fields, putting higher standards of quality on many refractory products, and developing products which were unheard of only a few years ago. With higher temperatures and new processes developing in the steel and other industries, a new challenge is being directed at the refractories industry to keep pace with the new requirements.

Harbison-Walker in its modernization and expansion activities, places major emphasis on research and quality control. In June of 1959 an entirely new research center, featuring both fundamental and applied research, was dedicated by the Company. At about the same time, a new manufacturing plant designed exclusively for making such specialty products as plastics, castables and high temperature bonding mortars was completed at Fulton, Missouri.

Most recently, Harbison-Walker joined with the Carborundum Company of Niagara Falls, New York to form a joint concern—Harbison-Carborundum Corporation—for the production of fused refractories. Fused refractories are used as linings for glass and steel furnaces and in other applications where they must withstand high temperatures and the corrosive attack of molten glass, metal and slags. The manufacturing process involves mixing the components, melting the mix in electric furnaces to the molten state and then casting or otherwise forming the molten material into the various shapes required. The fused-refractory lines of Harbison-Carborundum include alumina-silica, magnesia-chrome and zirconia base refractories, together with cements and other auxiliary products.

Metal-encased basic brick were first introduced on an exclusive basis by Harbison-Walker in 1916, following the discovery of the principle by N. E. MacCallum. Harbison-Walker has maintained leadership in this field by a succession of improvements, culminating in a metal-encased and internally plated open hearth roof brick which, over the past year, has greatly improved the economy of the open hearth furnace, and has contributed materially to the all-basic furnace.

Made from high purity magnesite, extracted chemically from brines at the Company's plant at Ludington, Michigan, the internally plated metal-encased brick have added substantially to the steel-making capacity of existing open hearth furnaces and to very high production rates for new furnaces. Following successful pilot plant operation at Ludington during the past year, an entirely new processing plant is being erected there which is scheduled to begin operations by mid-1960. This plant will produce dead burned periclase of a quality never before obtained commercially.

Harbison-Walker was the first producer in the United States to make the full range of refractories for lining basic oxygen vessels and these linings have subsequently set campaign records in American shops. In the blast furnace, too, where ultrahigh pressures up to four times that of any present American blast furnace are contemplated, important developments are imminent.

Significant strides have been made by the Company during the past year in the manufacture and development of zircon refractories for the glass industry and silicon carbide refractories for the ceramic industry. Of particular importance is the new low-iron insulating fire brick designed for use in controlled atmosphere furnaces. In the non-ferrous field, probably the most important single development is that of the new high-alumina brick compositions by Haribson-Walker for use in modern aluminum furnaces. These brick for the first time meet the important need for refractories which resist penetration and corrosion by molten aluminum alloys.

General Refractories Faces 60's With Confidence based on research—new plants—new products

L. Y. Greene
President

The decade of the 1950's has been mose noteworthy in the refractories field for the significant emphasis which has been placed upon increasing the quality of our products. The multitude of developments in the industry during this period all bear witness to this new emphasis.

The most dramatic of these developments, including the all-basic open hearth furnace and the increasing use of monolithic furnace linings in many industrial applications, have affected major changes in refractory consuming industries. In turn, they have had a marked effect upon thinking and planning within the refractories industry.

We are today engaged in the most intensive research and development program in our history to improve our products and to develop new ones to meet the demands of industries for higher and higher quality products. New manufacturing techniques are changing methods long considered standard and quality control procedures play as important a role in the modern refractories plant as pressing and firing. Refractories today bear the stamp of quality and of research as never before.

The refractories industry have made other changes in operations as well. We must be more selective in procuring our raw materials. Established mineral reserves have had to be re-evaluated and new ones acquired. Our technical staffs have expanded to meet the demands of customers for more assistance in installation and in testing new materials in service.

All of these evaluations have been good for General Refractories Company and for the industry. We have committed ourselves to planning in terms of an ever-changing future and have invested heavily in new plant and equipment and in highly trained personnel, both of which are being fully employed in keeping General Refractories in a position of leadership in developing and improving refractory products. As a result, we look forward confidently to the next decade with the assurance that we can and will meet the demands made upon us for improved refractories in mass production quantities.

Walsh Refractories Optimistic for 60's

A. J. Tomasek
President

Because practically every essential product of modern civilization depends on refractories for some stage of its output, any period of sustained or abnormal growth in population creates a corresponding growth in the demand for refractories, not only for maintenance items which are automatically consumed in proportion to the increased rate of production of our basic needs, but also for refractories which go into the new capital ventures which will be created by our rapidly changing way of life.

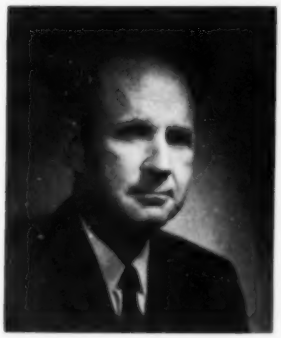
If we consider one basic commodity alone, such as glass in its many forms and uses, the great increase in the consuming population which will take place in the roaring 60's will mean more transportation, industrial plants, skyscrapers, shopping centers, schools, hospitals, and of course food stuffs and beverages, all of which because of its aesthetic appeal, permanence, and practicability require glass in some form or other; namely, automotive, sheet, plate, rolled, or containers. Due to its composition and the elevated temperatures required, the manufacturing process of the many types and forms of glass are highly destructive to all grades of refractories.

Because there is no all encompassing refractory as yet available or developed, economics dictate the use of many types of refractories by the glass industry, each one selected for its resistance to the particular form of attack present.

Being recognized as specialists in the production of glass contact or glass melting refractories, we have also recognized this growth by placing ourselves in position to serve this great industry. Already a producer of all types of fire clay refractories and specialties, and a leader in the production of slip casts, clay blocks and shapes and Zircon refractories, we have recently completed and put into commercial production a complete new plant for the production of superior electrically fused cast refractories.

While built primarily for the production of glass contact refractories, our research is continuing in the development of similar products for other industries. As we approach the eve of the roaring 60's, we stand ready to face the challenge they pose to our industry, its talents, and its leadership.

A P Green Suggests Alertness to Increasing Rate of Industry Change



W. S. Lowe
President

There is one theme with which most of us in industry can agree today. The successful companies of the future are built on progress and that, in turn, means change. This is a simple way of saying that whatever the future holds it will be different.

Those of us in the refractories industry have realized for many years that we are very closely linked to our customers. We are either coping with problems brought about by customer demands or are introducing new materials or applications for our customers to use. An industry most alert to the future proposes these new materials or applications before they are demanded by the customer. Perhaps progress in this area has not been so great as it might have been.

Obsoleteness of equipment or plants caused by changes and improvements will present new and sobering problems to many companies. Also the recognized need for research and development will create cash demands for capital investment and continually increased costs. Although we are aware of an acceleration in changing conditions, this rate of change is going to quicken. No one can foresee a specific direction which development programs will take, but neither should anyone deny the necessity for motivating and guiding them.

This suggests the simple thought that throughout our industry we will need some very mature, sincere and intelligent guidance, and serves to define future progress within the limitations of those who guide the industry.

Illinois Clay Prepares With Extended Research

Howard F. West
President

"Increasing industrial process temperatures have necessitated a higher degree of control over present refractory materials and the use of higher purity minerals. In like manner new types of production units, especially in the steel and related industries, producing standard materials or new materials have brought many new refractories into production or created bigger markets for materials almost unnoticed ten years ago.

It is also apparent that refractories producers are being called upon to produce a product within tighter specifications than at any time in history. This has brought about a need for new types of refractory production equipment and processes. Modernization of plants is certainly apparent wherever one visits in the refractories industry.

Research holds the key as to how well the refractory industry will do in the future. The industry is now undergoing a very marked change which should continue if we are to keep up with the technological changes of the industries we serve.

Illinois Clay Products Company has devoted much time and effort to the problems of quality control and new product development. Research within the Company and that which we sponsor at the University level is increasing each year."

Gladding McBean Meets Challenge With Basic and Applied Research

W. F. Godejohn
V. P.-Gen. Man.

As a representative of dedicated service industries, the Refractories industry is an outstanding example. It has been continuously called upon by its customers to improve, upgrade and modernize its product to withstand ever increasing conditions of use and exposure. The result has been drastic changes in operating technologies of its customers and accelerated product obsolescence.

The refractories industry of the future cannot be interpreted as a dynamic, expanding and glamorous one. True, its products will find new applications but it is equally fair to predict the loss of some of its existing markets. The practical knowledge of raw material beneficiating, blending and processing will no longer be the only necessary tools for continued existence and possible progress. The "how," the "when," and the "why" of raw material composition and formulation will be even more important.

Expanded basic and applied research will be a requirement for the meeting of customer product specifications. And these specifications will continue to change as demands for greater efficiencies in heat confinement are demanded. Gladding, McBean & Co. expects to meet and anticipate its refractory customer requirements through the continuation and expansion of its research and development efforts in the technological, processing and market fields.

B & W Predicts Expanded Market for Castables in 60's

J. E. Brinkerhoff
Consultant

With the present day trends toward higher temperatures and more severe furnace conditions, refractories manufacturers must be willing to modify existing products and develop new products to meet the demands and requirements of various specific industries. This of course holds true for most types of refractories; it is partiularly interesting to see how this has taken place in the case of refractory castables.

A little over 10 years ago, prior to the introduction of the first 3000 F castable by Babcock & Wilcox, castables were limited in use to boiler baffles and other applications not directly exposed to the high temperature conditions in the furnace itself. Since that time, refractory castables have been used interchangeably with prefired shapes for complete furnace linings and in temperatures far beyond previous limitations of such materials.

Subsequently, many types of refractory castables have been introduced for specific industry installations. These include lightweight insulating castables, special erosion-resistant castables, those for service in the hearths of heating furnaces, and others which are capable of withstanding temperatures up to 3200 F. The use of castables has expanded so that today he tonnages produced are over two and one-half times those of ten years ago.

One of the reasons for this increased use of castables is that the installation time is decreased substantially as compared to installing pre-fired shapes. The other important factor is that large inventories of special shapes are not required. These two items combine to make the use of refractory castables attractive to the user. With the high quality which has been developed, the performance and service life of those castables compare very favorably with other alternate types of construction.

New applications also provide many opportunities for refractory castables. Products must be developed to meet a wide variety of special conditions, where not only high temperatures but high gas velocities are a problem or where reactions occur requiring chemical stability as well.

In order to continue to meet industry requirements, however, manufacturers must be prepared to supply compositions which are designed primarily to give satisfactory service for the specific industry, whether this be the steel industry, aluminum industry, the petro-chemical industry or the structural clay industry.

The research and development laboratories of all progressive refractories manufacturers have been greatly enlarged and expanded during the past several years. Today, many are putting special emphasis on the fast growing field of refractory castables.

Globe Brick Improves Ladle Brick for Push in 60's

Winston Porter
President

The transformation occurring in the Globe Brick Company within the past ten years probably has been the greastest in the history of the company. The trend of improvement within the steel industry has notably increased its demands both in quantity and qualifications for ladle brick. The basic oxygen steelmaking process and the installation of oxygen roof lances in the open hearth furnaces indicates the increase in tonnage of steel, thus denoting the demand for additional brick. The research laboratories of the steel industry are placing greater emphasis on the qualifications of products used; therefore, more rigid specifications must be met.

The ladle brick is no longer "just a brick", rather it has become a specialized item requiring specific characteristics such as bulk density, reheat expansion, correct sizing and other qualities that will give the consumer longer life at the lowest cost of installation in their ladles.

Following this changing picture in the past, for the present, and in the future, we have formed our planning to include not only the improvement of the product but also the modernization of our personnel, facilities, method of transportation, mode of operation, and other factors. Our initial step began with the acquisition of qualified personnel who were specialists in their various fields, such as our ceramic engineer, mining engineer, and industrial engineer. With their knowledge combined with that of our manufacturing personnel, we have expanded and modernized our mining operation, our manufacturing operation, our research and development, and our quality control program.

Among the projects recently completed is the installation of a fully automatic gas firing system on our periodic kilns; eliminating human error, providing efficient operation, increasing production, and improving qualifications. Our mining program has given us increased tonnage, better control in the selection and removal of clay, quicker material handling to our manufacturing area.

The latest addition we have made is a pilot plant where the engineering personnel can carry on projects to improve the properties of our ladle brick; including bulk density, reheat expansion, refractoriness, and uniformity of size. Facilities to check modulus of rupture, Pyrometric Cone Equivalent values, firing procedures, Ph values, screen analysis among others are available. This pilot plant unit can duplicate the manufacturing process from the raw material to the finished product with complete control at all points. Besides improving the quality of our product, we can research into allied fields for the purpose of diversification. The pilot plant will be a considerable benefit to our customers and to ourselves.

We anticipate a greater demand both in quality and quantity; so our manufacturing operations are being geared to that end. An improved commodity that will provide the customer with lower operational costs is our aim.

Freeport Brick Plans Well Ahead

Francis Laube
President

Throughout the past ten years the demand for refractories has changed so drastically that today's refractory industry amounts to an entirely new industry. A sizeable number of smaller companies have merged with larger companies in order to be able to better survive the modern transition. Although the trend is away from smaller companies, we, at the Freeport Brick Company, believe there will always be a place in America for the small independent business. We are firmly convinced that although larger companies have definite advantages small business is a necessity to the free enterprise system on which our country was founded and survived through the years.

To survive however even a small company must be able to keep pace with its larger associates. In the past ten years our company has undergone the very radical changes which applied to our industry and we have taken them in stride. We are now assuming the responsibility of carrying our customer's inventories, maintaining the test work required to insure uniform quality, and, above all, we have delved into scientific research required to develop a better product. The latter is a must if we are to be in a position to keep pace with our customer's rapid advancements. Today, even a salesman must be a highly skilled and trained individual and not just a bearer of a good cigar. These are only a few of the major changes required of the entire refractory industry.

In order to keep pace it has been necessary to change our methods from the strong back variety to the strong mind variety. Instead of looking ahead as far as tomorrow as we did in the past, we are now considering problems with which we will be confronted in five or ten years. Research today not only delves into a series of minor changes in a particular product but complete changes are being made from molecular structure right on down to the basic shape itself.

We hear daily of research and advancement being made in medicine, science, and numerous other fields. Yet, if the truth were known, the fact that if the refractory industry had not kept pace or even surpassed the advancement made in other fields of research it would have been virtually impossible for advancement in any of these fields. It is possible to assume that we would have no steel, aluminum, glass, etc. In order for advancement in these fields, refractories must advance first!

As for production, here again, we must be able to keep pace with the everchanging industrial world of today. If modern methods of production are lacking, then progress suffers. We have a motto among our supervisors which I believe sums up our position on production where the future is concerned and that motto is: "when a day goes past without trying something new; that's the day your company could have done without you".

In conclusion, we feel that although the manufacture of refractories is one of the oldest arts in the world and without the strides made by our industry we would still be existing in the Dark Ages, that the day is fast approaching when our industry will receive the prominence it so justly has earned in the past, through even greater technological advancements.

Chas. Taylor Sons Calls for Good Management—Top Grade Personnel

R. W. Knauft
President

"The future belongs to those who prepare for it". You've heard this many times as it is applied to the individual, a company or an industry. This statement is usually interpreted to mean basic research, product development, modernization or expansion of facilities. These are the tangible, material evidence of planning and progress. *But* planning and progress have one thing in common—PEOPLE. An industry which today concentrates on making more and better bricks and neglects to make people at the same time, will not endure.

That the refractories industry is essential, no one denys. However, ours is a quiet industry, working without fanfare behind the forges, furnaces and mills which touch nearly every phase of our every day life. What are we doing as an industry to attract the high school senior or the college undergraduate, to a career in refractories? The Refractories Institute published its first career brochure several years ago and it was a good one. This alone is not enough. Many companies today are sponsoring fellowships in the ceramic schools and a number of companies have plans wereby employees may be reimbursed for attending classes in night school, taking correspondence courses, etc. which will help them to prepare for opportunities which may arise. This makes for better employee relations and permits growth from within.

Individually and collectively it is our job to make refractories that won't come back for customers who will. In our free enterprise system, this means that we shall be judged by the profit we earn, our importance to the national economy, the integrity of our leadership, growth potential, our relations with labor, and the quality of our products here and in foreign markets.

Are earnings and employment subject to wide variations due to demand, or price instability? Is the industry respected by those whom they serve.

Do refractories plants make good neighbors? Do we have a reputation for good community citizenship, at both the corporate and plant management level?

These are but a few of the obvious check points against which our record will be judged by financial institutions, and the investing public on whom we

rely for capital required for major expansion and development. A favorable answer to these questions will influence both the type, quality and number of young men we will attract and upon whom our future will depend.

Let us take advantage of every opportunity to inform the public generally of the contribution which the refractories industry makes to our society. Let us continue to develop good management potential for the future by making it a point to attract, employ and train men selected from the upper third of the group from which they are chosen. The wise and experienced hand of the older executive is needed to flesh out the organization and to guide the enterprise over the shoals which competition, world conditions and the march of progress place in our path. However, only the young have the courage, the enthusiasm and usually the originality which can provide the spark fou progress, service to our customers and a fair profit.

As an industry, let us provide opportunity—the best form of job security, public or private.

Kaiser Executive Notes Ever-Changing Refractories Industry

Frank M. Cashin
V. P. Div. Gen. Manager

Looking back over the past 10 years, you can't help but be impressed with the very significant changes that have taken place in the refractories industry. Among the most significant of these is the demand by the industries we serve for longer-lasting products of higher quality. This trend is a result of the changing economics of industry and the necessity to push furnaces harder in order to increase production.

This trend accounts for the increasing use of basic refractories in open hearth steel furnaces, for example. The battle to determine the type of refractories to be used in the roofs of open hearths is being fought on the basis of economics which includes cost and performance. In clay refractories, the demand for better, longer-lasting materials is just as apparent. The growth in use of superduty brick, the interesting developments in gunning refractories, and of refractories specialties are cases in point.

New processes and new practices in the industries which use refractories have been a continual challenge to the refractories industry. One such new process is the basic oxygen steel process which will grow in importance. This development has brought a new technology to the refractories industry. Our own company, for example, has been working on the development of basic oxygen refractories for a matter of years. During the early stages of research, we began testing our refractories in the basic oxygen furnaces of Europe. Then we had to develop a means of producing these materials in commercial quantity, maintaing the best combination of characteristics affecting performance. We will soon be making an announcement concerning a major development in this field.

While there have been a few exceptions, most of the technical progress which we as an industry have made to date has been the steady year-after-year improvement of our product lines. Big dramatic breakthroughs have been rare. Because of this, there may be a slight tendency on the part of all of us to be sort of lulled into thinking that these improvements will continue to come along. So perhaps in 1960, as the start of another decade, it is the time to take a new, critical look at what we are now doing in research, to look at our manufacturing procedures, our raw materials and the ways our products are being used. A few fresh approaches could produce some startling results.

As time goes on, we are going to find that raw materials will become more and more critical. Uncovering new sources of materials are going to require extensive exploration. The problem is compounded because an important requirement is that these raw materials be high quality. If anything, these raw materials need to be better than those we have used in the past in order to meet the requirements of the consuming industries.

There is another area which can stand a great deal more emphasis in our industry than it has received in the past. I refer to marketing, a function which is very highly developed in some industries, but one which has not reached its potential in refractories industry. Marketing refers to market research and development, the analysis of the specific needs of our customers, translating these needs into products by working closely with the research and technical staffs, and then taking the product to the field to develop new applications. For marketing techniques to be really effective, we are going to have to develop more market information than we have had in the past and then learn how to use it.

If, as many seem to feel, the 1960's are going to be years of great economic growth, our industry is going to have a real job on its hands to stay abreast.

This makes it imperative that we re-evaluate our research activities, increase the intensity of our raw materials exploration, give greater emphasis to market development, and do everything humanly possible to develop our people for these challenges ahead.

Acme Speaks as Refractories User

Neill M. Boldrick
President

We think a comment on the use of Refractories in our own industry's plants might be of interest.

In the operation of nineteen plants owned by our company, we are extremely large users of refractory products.

Due to advancing labor costs and various other factors influencing construction costs, we are constantly developing new methods, new products, and other better installation practices. This affords us dependable maintenance-free kiln construction. Quite naturally modern or advanced refractory practices have other far-reaching effects and result as well in reducing burning cycles, savings on fuel consumption, and eliminate down time.

Our departure from old fashioned heavy kiln construction has been extremely gratifying. Well-engineered supported or anchored construction has proved highly successful from every aspect. Supported wall and arch construction, though initially higher in cost pays off in just a short time. Maintenance on this construction is simplified as well by east of application.

For years many have viewed plastic refractory as a material for patching. This material is still used extensively for this purpose; however, test application over the past few years has proved that entire kilns built of this material are highly successful. We have several in operation, and contemplate further use of this construction.

Development of superior cast refractory products has led us to effect further excellent results in instances of our own needs. Further research in improving cas refractories is certainly more than just a casual interest to us. These highly versatile materials should and will ascend in import to industrial requirement.

In the manufacture of clay products, we are continuously increasing our demands for better and more versatile heat-resistant materials. Industrial demands are parallel to our own particular situation. Increased production in industry today is the watchword. Hand in hand with increased production goes more intensive service for processing equipment of which refractory materials are an integral part. Now more than ever before, quality is essential. This will be continuous, and will be more acute in the future.

It is our belief that the refractory industry of the future will be highly specialized. Specific products for many specific services will come forth. The ability of the industry to meet this challenge will depend on its analytic approach to our changing times.

Ramtite Expands Specialty Time For the 60's

T. Kaufman Jr.
President

Our company's interests are principally in the fireclay and high alumina refractory specialty field. This includes plastic refractories, ramming mixes, castables, mortars and refractory gunning materials. We cover the temperature range between 1800°F and 3400°F.

All of these products have in the past ten years gained substantially in acceptance by the large users of refractories. For example, ten years ago, a few steel plants were somewhat skeptically experimenting with super duty plastic refractory as linings for soaking pit covers. Today, the steel plant that is *not* using plastic for this service is becoming the exception, and some operators state flatly that the use of any other type of refractory is out of the question in their mills. There is the same trend in other parts of the soaking pits and in other types of reheat furnaces. Similar, although somewhat lesser trends can be seen in the widening use of other refractory specialties. We believe that this trend, which is essentially towards monolithic refractory construction, will continue. There are two fundamental reasons for this: economy and furnace availability.

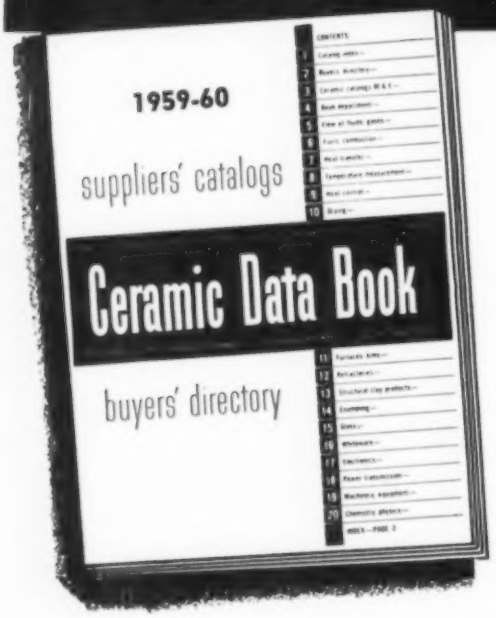
The increased future use of refractory specialities for monolithic construction will come from three sources: first, wider use of these materials is present, proven application; second, additional new applications which will be proved out; and third, new improved products that will be developed in the future.

We believe that the refractory industry is now adequately equipped to meet a substantially increased demand for refractory specialities. Our own company has just recently placed in operation a new plant devoted now, exclusively to the production of plastic refractory. This plant has ample capacity to take care of all present requirements. Additional facilities for increasing this production and for producing other refractory specialities there, are now being planned.

HOT OFF THE PRESS ! . .

THE NEW 1959-60

Ceramic Data Book



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New tabular graphic technical information for all ceramic industries and processes

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Be sure to thumb through your copy immediately—to acquaint yourself with the new products and items—for future reference—it's important to your building and production planning.

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basic refractory products.

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PITTSBURGH 19, PA.

Yes, I would like my copy of the new "Basic Refractories-Brick and Specialties" —Bulletin 71, right away.

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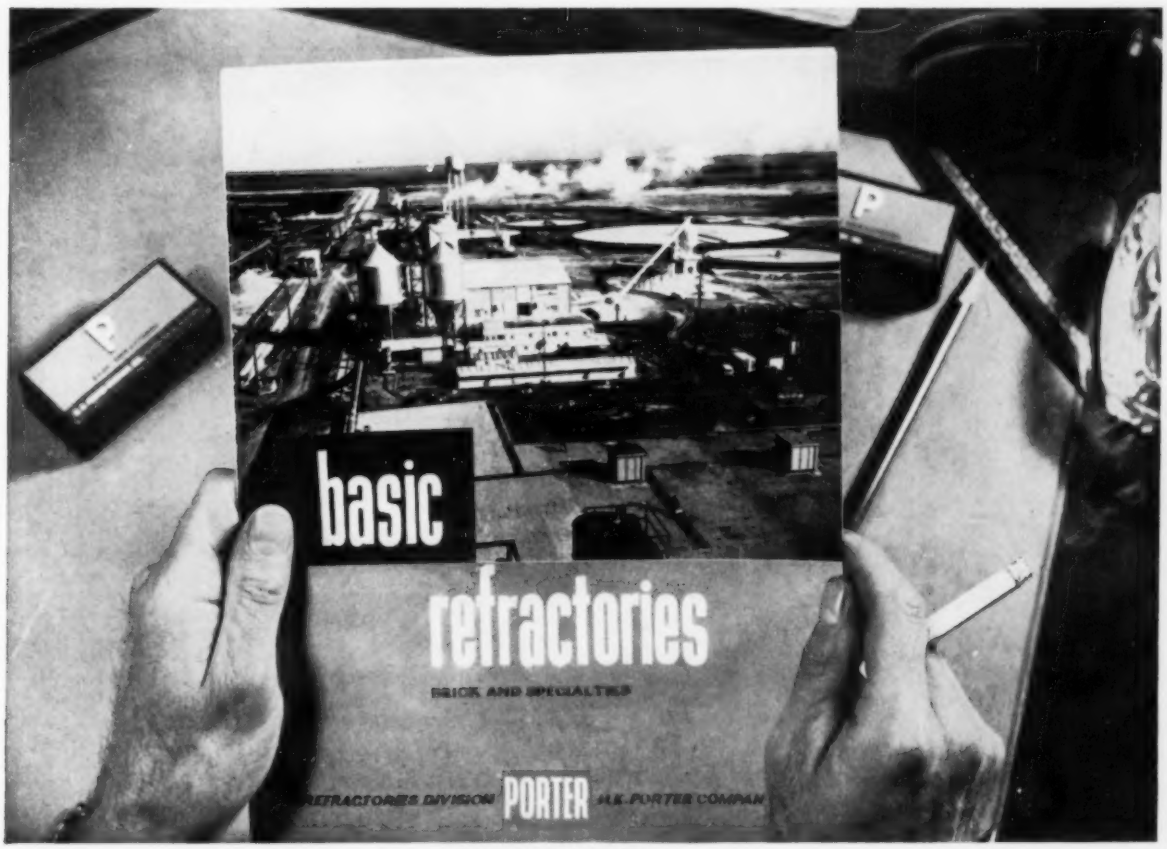
from the New Pascagoula Works . . .

PORTER BASIC REFRACTORY PRODUCTS

Here is a *new* full line of Basic Refractory products . . . BASIC REFRACTORY BRICK in Chrome Magnesite, Magnesite Chrome and Periclase—burned and chemically bonded in both metal clad and plain categories. And BASIC REFRACTORY SPECIALTIES: Plastics, Castables, Gun mixes, Ramming mixes and Air-set mortars. Product Bulletin 71—"Basic Refractories-Brick and Specialties" gives complete descriptions and application suggestions.

This comprehensive line is being produced at the new Porter Pascagoula Works . . . modern, fully integrated sea-water periclase and brick facilities for the exclusive production of basic refractories.

For information about this dependable, new source of supply, shipments, prices or assistance on *any* basic refractories problem, write: *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*



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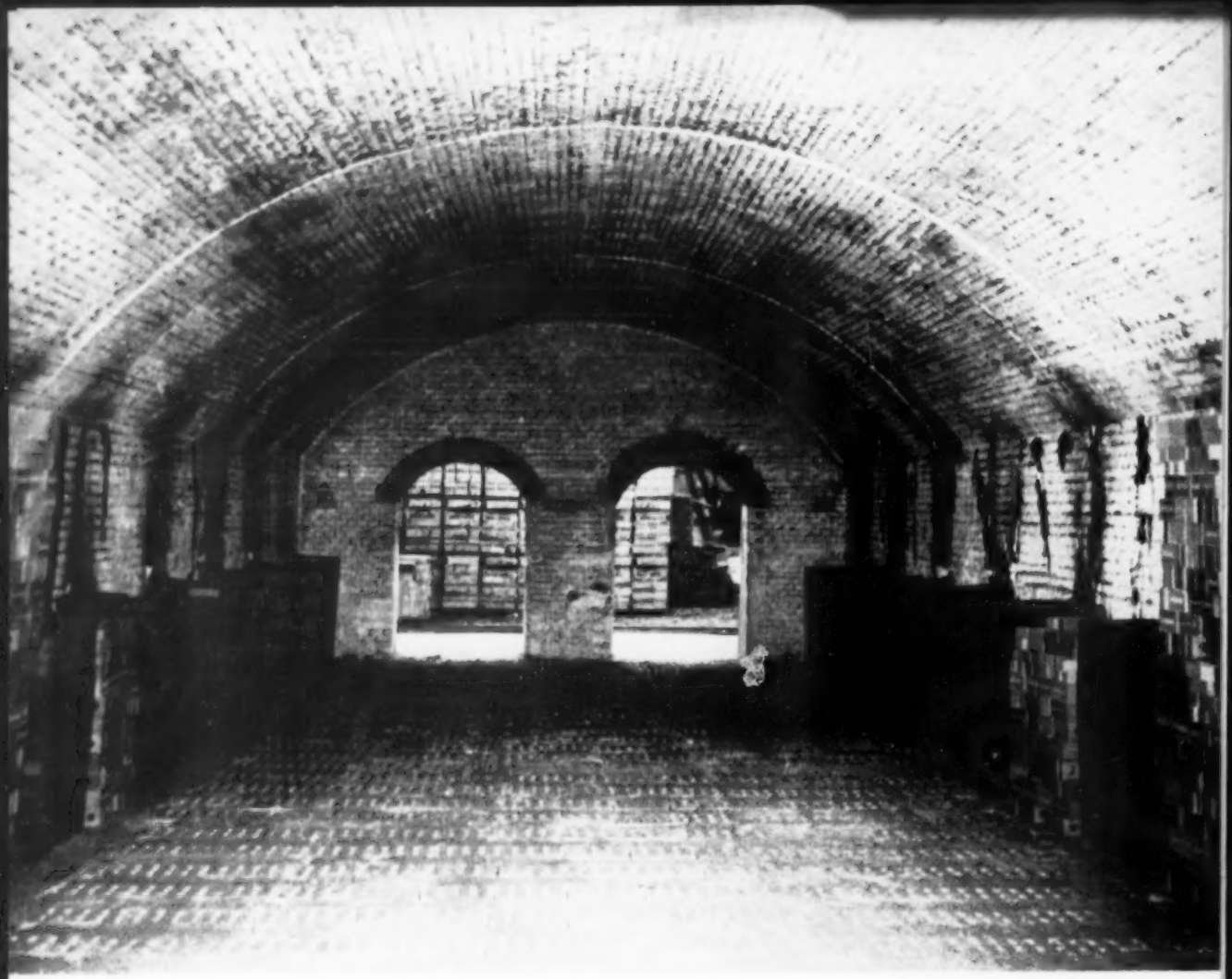


ALLIANCE CLAY PRODUCT CO. reports:

Fuel costs reduced up to 23% in kilns lined with B&W Insulating Firebrick

A metered fuel consumption study of six kilns lined with lightweight B&W K-20 Insulating Firebrick was conducted by the Alliance, Ohio, plant of The Alliance Clay Product Company.

Here are the results:

- ***Fuel costs were reduced by up to 23% in circular kilns and up to 18% in rectangular kilns.***
- ***Cycle time was shortened in both types of kilns.***
- ***Salable ware was appreciably increased.***

As a result of this profitable performance, Alliance lined 23 rectangular kiln crowns and 2 circular kilns with B&W IFB.

Here's why *lightweight* B&W Insulating Firebrick slash fuel costs. They store and conduct less heat. Low heat storage permits quicker heating and cooling of the kiln, with less usable heat lost to the atmosphere. They also help step up production and cut cycle time, because they come up to operating temperature faster. Thus, the low heat storage and thermal conductivity of B&W IFB reduce fuel input—and cut your fuel costs.

Bulletin R-43 gives helpful data on the use of B&W Insulating Firebrick in periodic kilns.

Send for your copy today.

B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

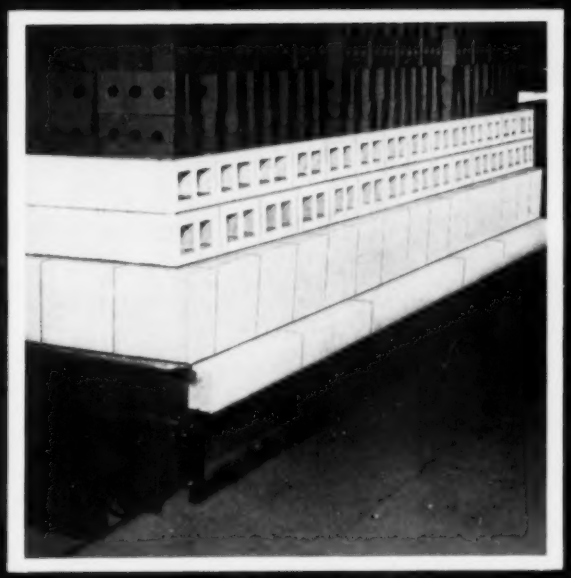
R615

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber

PACO

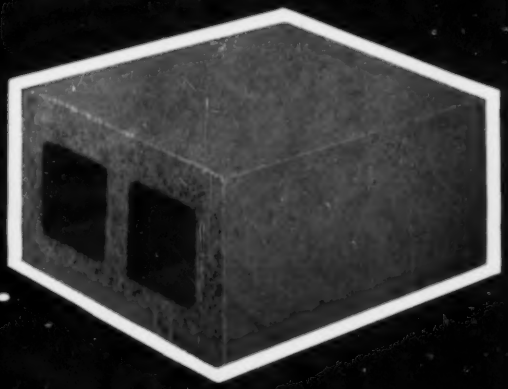
CAR TOPS

cut replacement cost by as much as 50%!



It's a fact . . . nine out of ten users of PACO CAR TOPS are satisfied customers—and all report replacement savings up to 50%! For the utmost in service, you require a good first quality car top, highly resistant to spalling, and a good hot load test . . . and you get just that when you standardize on PACO.

You and your plant can enjoy these increased savings simply by placing a trial order. There is a PACO engineer as close as your telephone . . . or write us direct for complete information.



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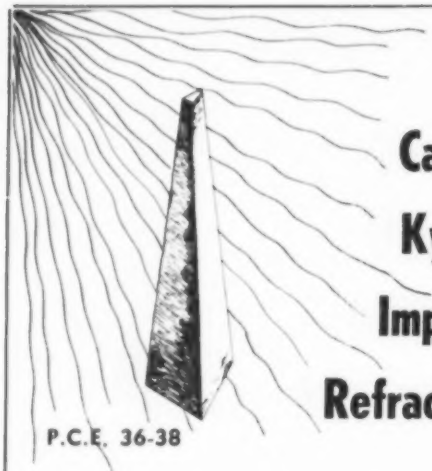
OTHER PACO PRODUCTS INCLUDE: • PACO PLASTIC • PACOCAST • PACO H.T. CEMENTS • PACO FIRE BRICK MORTAR • PACO SIDE CAR BRICK • PACO FIRE BRICK • PACO LADLE LINING • PACO HEATZONE COMPOUND



Carolina Kyanite Improves Refractories

P.C.E. 36-38

Carolina Kyanite has as high an alumina content as any naturally occurring aluminum silicate available. By blending the proper grain size of Kyanite with other materials you will produce stronger, more uniform, longer lasting, and more economical refractory materials.

Dimensional Stability

Carolina Kyanite readily converts to Mullite at 1450° C when heated alone, or as low as 1200° C in the presence of a flux. Accurate control over the dimensions of fired bodies is possible when the proper grain size of Kyanite is blended with other ceramic materials.

For all practical purposes, all dimensional changes in Kyanite occur during the conversion to Mullite, with no further expansion or contraction thereafter.

High Heat Strength

High-temperature load bearing strength is measurably improved when Carolina Kyanite is added to refractory materials. The extra strength imparted cuts losses due to cracking and flaking.

Heat Resistance

With a P.C.E. of 36-38, Carolina Kyanite gives Super Duty quality to refractory materials for improved resistance to intense heat.

Commercialores has conducted extensive research on the use of Carolina Kyanite to produce better refractories. Technical papers and samples are available on request.

Grain sizes: 35, 48, 100, 200 and 325 mesh.

KYANITE

MULLITE

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SUPERIOR LADLE BRICK

wire cut and dry pressed

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Guarantees to our customers Safe, Efficient and Low Cost Ladle Practice
Always Dependable
Globe Superior Ladle Bricks are used everywhere for all types of Iron and Steel ladles

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FIRE BRICK

WARCO XX, High Duty

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HI LUMITE 50
HI LUMITE 60
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50, 60, & 70% Alumina Content, respectively

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CASTABLES

A complete line of both Service and Insulating types, including
H & B CASTABLE and SUPER CASTABLE #32 (3000° F)
LITE WATE #50 Insulating
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PLASTIC FIRE BRICK

WALSH PLASTIC FURNACE LINING

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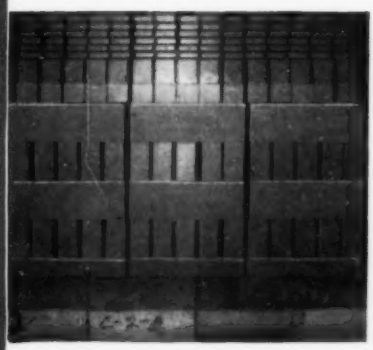
MORT-AIRSET, high temperature cement for air tight joints in all fire brick work.

METALOK, heat setting mortar for bonding fire brick to retain metal and slag.

Meeting the Challenge

of the Heavy CLAY PRODUCTS INDUSTRY

Exacting Requirements of the Space Age are met and mastered in Walsh Refractories. From pit to lab to finished product—under strictest standards of quality control—Walsh sets the pace with large clay reserves, improved research facilities and continued important additions to plants and equipment. With constant progress as the goal, Walsh sets its sights on playing an increasingly important role in the great refractories industry.



WALSH C-64 CAR TOP TILE

The amazing life span of Walsh C-64 Car Top Tile, with Warco XX, Dry Press Deck Tile, is credited to their unusual resistance to impact and spalling. Solid and stable, they withstand heavy loads. Can be used on any type of refractory car top base. The assistance of our Engineering department in meeting your particular requirements is available on request.

WALSH K-11 FORTIFIED PLASTIC

Fire Box Arches constructed of Walsh K-11 ramming mix demonstrate in full measure the ability to successfully resist high temperatures and severe thermal shock without deformation following extended periods of hard usage ...your assurance of exceptional service life at lowest cost.

WALSH BB-161 SUPER PLASTIC

An airsetting plastic producing high strength at atmospheric temperatures, *installations of which do not require immediate burning in.* Strength increases as burned in temperatures are reached. Wire, write or phone for complete technical data.

WALSH MORT-AIRSET

An airsetting high temperature bonding mortar for laying up and surfacing high heat duty and intermediate duty fire brick and tile. Only Walsh Mort-Airset gives you all the "extras"... extra strength, extra workability, extra resistance to severe furnace conditions and temperature extremes ... every performance characteristic you've ever wanted in a refractory cement.

WALSH REFRACTORIES CORPORATION — America's Best Clays

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FIRE CLAY SPECIALISTS IN REFRACTORIES OF HIGH BULK DENSITY AND LOW POROSITY

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Steel

104 Years in business
World's Oldest and Largest
Manufacturer Pouring
Refractories

Ferrous Metals

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FIRE BRICK for
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Made of the famous Kentucky Flint and Lawrence County Ohio, Refractory Clays

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ASEE — O.K. CROWN

Intermediate Heat Duty

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World's Best Ladle Brick

Quality and Performance
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FREEPORT BRICK CO.
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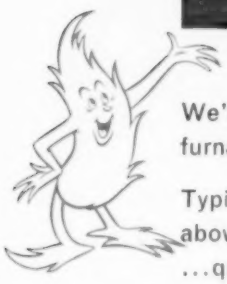
GMcB REFRACTORIES line the furnaces of Western Industry



We're pleased to have participated in the construction of major furnace units up and down the entire West Coast.

Typical of the installations are the three blast stoves and stack pictured above which are lined with GMcB high duty and super duty firebrick ...quality controlled to meet the exacting demands of western industry.

Whatever your refractory requirements for the Pacific Coast or adjacent western states, it will pay you to check with us first.

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FIRST IN THE FURNACES OF WESTERN INDUSTRY

Forecast Bright Future for Pipe

Optimism Keynotes NCPMI Meeting In West Virginia

A Report by NCPMI President G. A. Robinson

G. A. Robinson

The 1959 Fall Meeting of the National Clay Pipe Manufacturers, Inc. was held at The Homestead, Hot Springs, Va., recently.

Highlighting the meeting was the optimism expressed for the future of the Clay Pipe Industry by the producers of vitrified clay sewer pipe from all across the nation.

Public sewer construction was forecast for an all-time high of $750 million in 1960, and industrial construction contracts, prime users of corrosion-proof vitrified clay pipe, were running 40 percent ahead of 1958. Well over a million housing starts for 1960 look good for small diameter pipe. Other users of clay pipe, because of its never-wearout qualities are schools, hospitals, public utilities, commercial structures with expected increases in 1960.

Barring unforeseen developments, 1960 looms as a busy year for the industry, particularly for its large diameter pipe.

The owners, production, research, promotion and market men reviewed their 1959 activities, added up their progress, and prepared an aggressive campaign for 1960.

An expanded industry research program strengthened with added personnel and diversified research projects, coupled with a broader, harder hitting advertising and promotional program, held the spot light at the Fall Meeting of the General Membership Meeting on Thursday, October 29th.

The financial report for 1959 and the 1960 Budget was presented by R. G. Scott, Treasurer; A. J. Reed, Director of Research, presented the financial report for the research activities during the past year.

E. C. Clemens, Acting Chairman of the Research Advisory Committee, presented the report for this Committee. He reported to the Board of Directors and the General Membership on the recommendations of the Committee regarding policy matters and administration of the research program. He also presented the recommendations of the Research Advisory Committee for the proposed expansion of the industry research program.

Sutherland Presents Reports

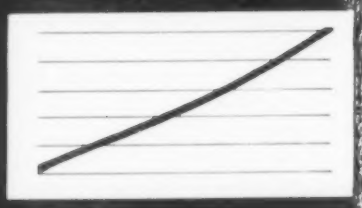
Clark Sutherland, Chairman of the Augmented Research Planning Committee, presented the report of this Committee. He outlined the recommendations made by his Committee to the NCPMI Board of Directors and to the General Membership meeting the following day. These recommendations included an expanded research program to cover all areas of manufacturing and marketing of vitrified clay pipe and related products, including but not limited to raw materials; ceramic mixes; form and formation of the product; manufacturing methods; equipment and techniques; end use of materials including installation and jointing techniques; and any other fields of investigation for the purpose of decreasing costs; bettering present products; developing new uses of these products and of new products to serve existing needs; and to aid in the promotion and acceptance of clay pipe industry materials—including activities in comparison testing of competitive materials. Also included in these recommendations was establishment of a plan that would more effectively allow the utilization of the results of the industry research program in the plants of NCPMI Members, all of which would be under the over-all direction of the Research Director. According to Sutherland, the expansion of the industry research program would eliminate the artificial separation of certain lines of research that have existed in the past, and the expanded research program would result in basic studies directed toward both the end uses of vitrified clay sewer pipe, and processes and methods involved in the manufacture of the product.

A. J. Reed, Research Director of NCPMI, reported on the projects currently being studied in the NCPMI Laboratory in Crystal Lake, Ill. He told of the progress being made in the laboratory on the development of new jointing techniques which may be used for all sizes of vitrified clay sewer pipe, and also commented on work now in progress which is designed to reduce the cost of materials

Continued on page 83

Improve Refractories with

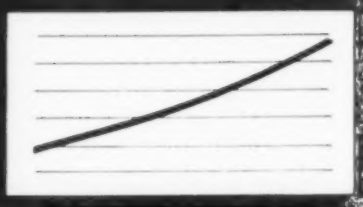
CEDAR HEIGHTS BONDING CLAY



Bonding strength increases with clay increase

. . . . is a truly superior bonding agent. From the world's finest clay deposits, it is super-refined so that it enables you to produce refractories mixes and molds with higher green strength, higher dry strength and higher hot strength. It is available to you in the following meshes: 8, 12, 16, 20, 30 and 50. Chemical and physical properties sent on request.

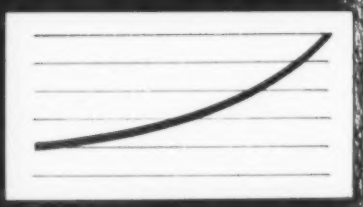
CEDAR HEIGHTS FIRE CLAY



clay increase

A better clay to begin with, Cedar Heights' intensive refining processes make this clay particularly adaptable as a bond in plastic refractories, ramming mixes, castables and foundry work where smoother and more precise castings are required. Delivery of this artificially dried clay, ground to 200 mesh, is never a problem. Extensive warehouse facilities, contain adequate stocks to meet your most urgent need. Chemical and physical properties sent on request.

CEDAR HEIGHTS AIRFLOATED CLAY



fine particles.

Mined from deep under selected surfaces, Cedar Heights Fire Clay is not ordinary fire clay. Modern refining methods eliminate the waste, reduce it to a semi-fine state. It is then electrically screened to size to meet your requirements. Available in No. 8, 12, 16 and 20 meshes, its plasticity, high refractory value and smooth, clean texture are features you can depend upon for superior service. Chemical and physical properties sent on request.

Write, wire or phone for detailed information and technical service. Phone Mutual-23945

CEDAR HEIGHTS CLAY COMPANY

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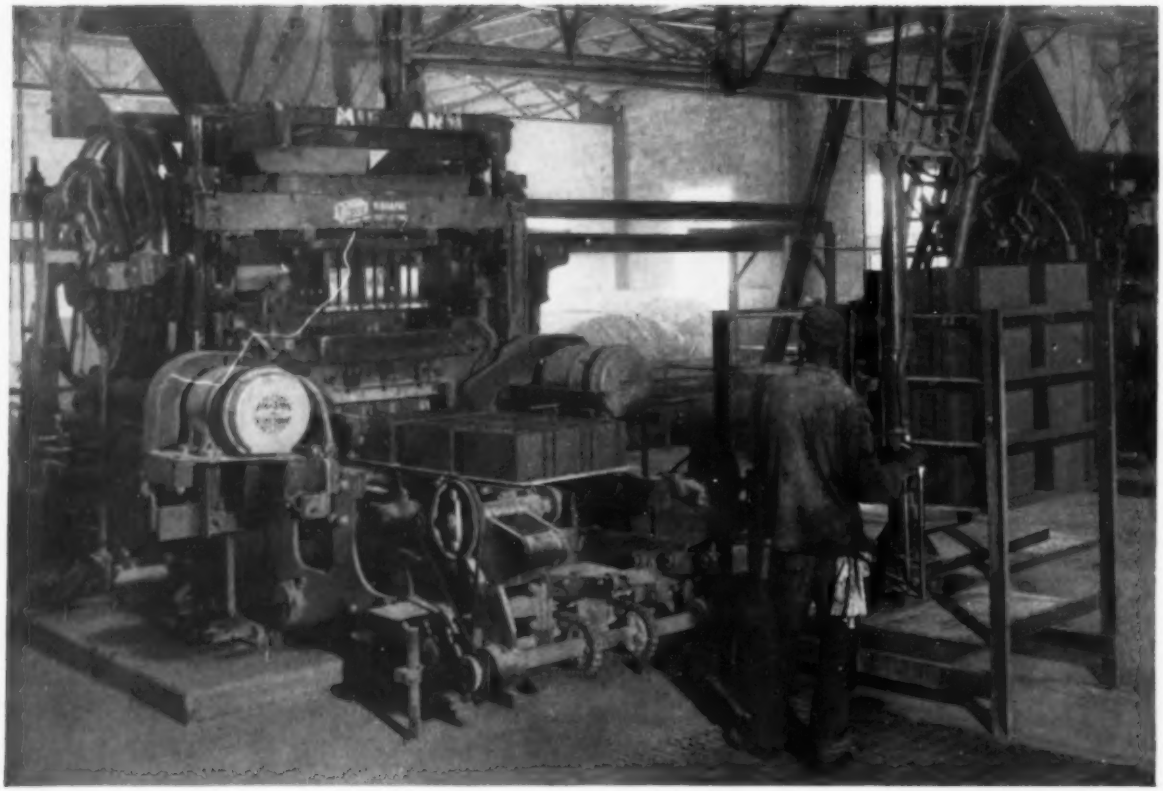
50 PORTSMOUTH ROAD
OAK HILL, OHIO



Why Besser chose Timken® bearings for Vibrapac

One plant—with 12 machines—produces over 5½ million blocks per month

Vibrating pressure on vital moving parts of this Model V3R Vibrapac is extreme as it molds and turns out thousands of concrete blocks a day. To take the thousands of shocks, assure steady operation, Besser Company engineers needed top quality bearings with high radial and thrust load-carrying capacity for the jack shaft assembly and heavy duty cam follower roller. Here's why Besser chose *Timken tapered roller bearings.*

1) *They take all loads.* Because of their taper, Timken bearings can take *any* combination of radial and thrust loads. And full line contact between their rollers and races provides *extra* load-carrying capacity.

2) *They minimize maintenance, last longer.* Because they hold shafts concentric with their housings, Timken bearings make closures more effective in keeping dirt and moisture out, lubricant in, maintenance down. And quality control in their manufacture from start to finish assures longer bearing life.

You get extra advantages when your machines are Timken bearing-equipped because of the Timken Company's leadership in tapered roller bearing design and in engineering service. One example: a modern Bearing Research Center, where we use development and testing facilities unique in the bearing industry.

When you buy Timken bearings you get: *1) Quality you can take for granted. 2) Service you can't get anywhere else. 3) The best-known name in bearings. 4) The pace setter in lower bearing costs.* The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

BETTER-NESS rolls on

TIMKEN®

tapered roller bearings

to help you make quality concrete block faster... and at lower cost...

BESSER SCHOOL

for anyone interested in the concrete block industry

(above) Practical demonstrations are a feature of the school.

(left) Students in Materials and Methods class, quartering, weighing, screening, and analyzing aggregates.

(lower left) Typical class in the Besser School. Lecturer explains the electrical control box of the Besser Vibrapac.

(above) Electrical maintenance session at the Besser School.

What is Besser School? A series of technical courses conducted by competent instructors to help you make quality block faster and at lower cost. *Who is eligible for participation?* Anyone interested in the concrete block industry . . . including cement salesmen, aggregate producers and all block machine operators. *What is the tuition?* There is no tuition — all courses are offered FREE. *What are some typical courses?* Twenty technicians and instructors provide a balanced curriculum, including classes on material blending and processing, mechanical operation, electrical operation, automation, curing, cubing, and proper use of masonry units. *It will pay you rich dividends to attend.*

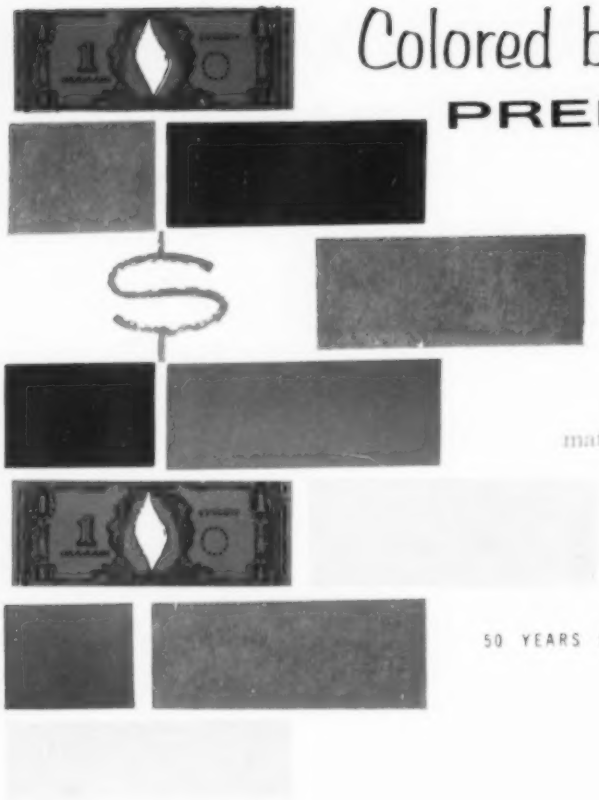
For complete information and enrollment data, write:

BESSER *Company*

Dept. 139, Alpena, Michigan, U.S.A.

First in Concrete Block Machines

A9-21



Colored brick brings PREMIUM PROFITS

At capacity? Want bigger profits on your volume? Colored brick is the answer.

Contemporary design demands color. Architects and builders are willing to pay a premium for materials offering this design freedom. *Now* is the best time to establish yourself in this booming market.

Pemco can supply you with quality materials for all types of color work. Pemco has formulated, or will develop for you, GLAZES, ENGOBES, and SAND COATING materials compatible with your clays. Write today for detailed information.

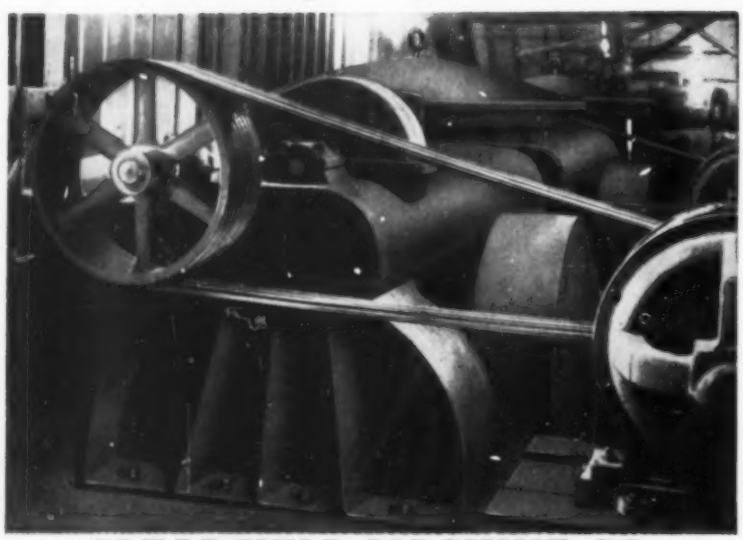
50 YEARS OF RESEARCH AND A FLAME

PEMCO

BALTIMORE 24, MARYLAND

CERAMIC FRITS AND INORGANIC COLORS

The Clearfield MAXIMULLER is unequaled for *Low* Grinding Costs



CLEARFIELD MACHINE CO.

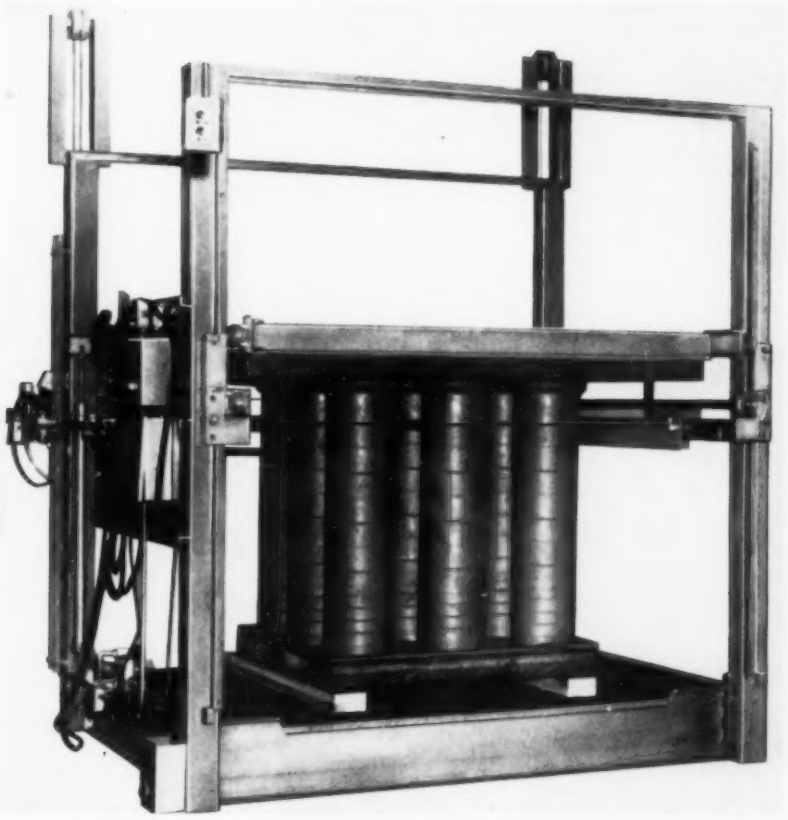
Clearfield, Pennsylvania

Pacific Coast Representatives: Fernholtz Machinery Company
8468 Melrose Place, Los Angeles 46, Calif.

The Maximuller, built in two sizes, No. 1 with 10 ft. diameter and No. 2 with 9 ft. diameter, represents a modern development of our standard dry pan design. It incorporates the same basic principles, that have proved their utility in meeting dry grinding requirements, as those of the heavy duty dry pans we have produced for many years. Among these features are the revolving pan with screen plates in the pan bottom and the large mullers, widely spaced for the greatest possible crushing effect. Though the operating principles are not new or revolutionary, certain design developments have enabled us to apply, with greater efficiency, our accumulated knowledge gained in over 75 years of constructing dry pan mullers. We believe the Clearfield Maximuller with its low maintenance and power consumption, is unequalled on the basis of cost per ton of product.

For complete description and specifications write for Bulletin B-53.

The NEW PEARNE AND LACY
AUTOMATIC RING CUTTER



(Patent Applied For)

Pearne and Lacy automatic ring cutter provides accurate rings cut to specified lengths. The automatic selector permits for selection of any ring length. The operation is automatic with the placing of pallet load on cutter platform. Pipe is taken direct from the production line and a full pallet load is handled at one cutting. No adjustment is required for pipe lengths of 3 to 5 feet. The standard cutter platform is designed for 60 x 72 inch pallets but can be made to handle any size pallet.

- **Automatic features eliminate Ring Crew**
- **Does not require soft clay**
- **Minimum adjustment for change-over**
- **Operates electrically & pneumatically**

Write for complete details

Engineers and Manufacturers of Automatic Handling and Finishing Equipment for the Ceramic Industry.

P.O. Box 3366, Terminal Annex,
Los Angeles 54, California **Phone: CU 3-1268**

Eastern Representative
Dwight B. Hendryx, 6621 Darlington Rd., Pittsburgh, Pa.

PEARNE AND LACY INC. MACHINE COMPANY

Never has there been a kiln car wheel to earn the industry's confidence as has the S-D "FLOATER"

"We think the best way to recommend or compliment S-D 'Floater' Wheels is to walk up to a loaded car and push it with one hand."

. . . says Mr. Homer Bryce, General Manager,
Henderson Clay Products Company
Henderson, Texas

"We have had excellent results with the Sanford-Day "Floater" Wheel. The first S-D Wheels we started using three years ago are still running as free as they did the first trip through the kiln."

. . . says Mr. C. B. Foushee, Sanford Brick and Tile Co.,
Sanford, N. C.

"We have congratulated ourselves many times on selecting your wheels and bearings for this operation."

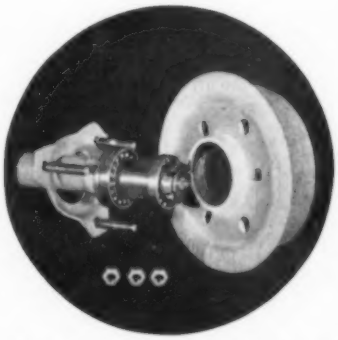
. . . says Supt. C. H. McDonald, West Brothers Brick Company,
Fairmont Heights, Maryland

"We are very much sold on Sanford-Day's Wheel and Bearing Assembly. From our experience and information we have gathered from other plants we are expecting years of trouble-free service."

. . . says Supt. Alvin Warden, W. G. Bush Co., Nashville, Tenn.

"We are well satisfied with our S-D Kiln Car Wheels"

. . . says Plant Engineer Philip D. Pearce,
Boren Clay Products Co., Pleasant
Garden, N. C.



The S-D "Floater" Ball Bearing Kiln Car Wheel successfully incorporates (1) completely closed outer hub, and (2) inner hub completely protected by two metal grease seals. These exclusive features effectively eliminate dust while retaining the special high temperature lubricant.

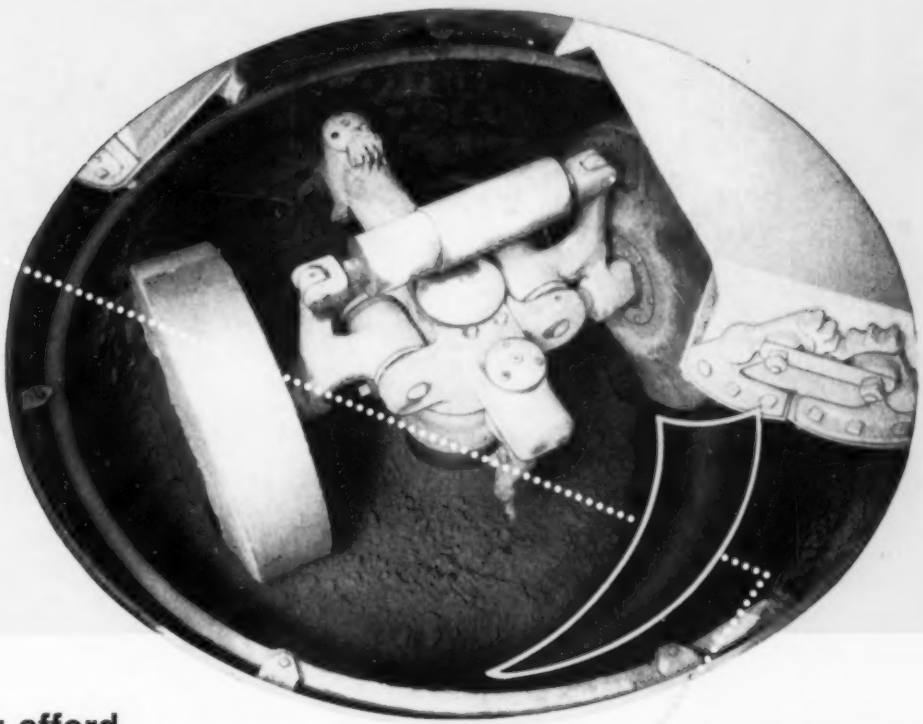
Now you can eliminate old and obsolete kiln car wheels and their costly everyday maintenance and lubrication by using S-D "Floaters"—developed and PROVED in scores of kilns for trouble-free high temperature performance.

Many sizes and styles are available so that you can use S-D "Floaters" on your present cars. Also available with tapered roller bearings. Ask us for complete information. Or, send us photostatic copy or blueprint of your present cars. With this information we can quote you on replacement wheels now. Simply address inquiry to *Sanford-Day Iron Works, Inc., P. O. Box* 1511, *Knoxville, Tenn.* Your request will be handled promptly.

SANFORD-DAY
KNOXVILLE **TENNESSEE**

MIX-MULLER®

MEANS CONTROLLED DISPERSION FOR REFRACTORIES



P160

Can you afford to settle for less?

Any mixer can blend . . . but *few* mixers can provide the *intensive* mulling action necessary to evenly and thoroughly disperse moisture and binders for dry press refractories.

Now, more than ever before, refractory producers have come to realize that *controlled dispersion* in a Simpson Mix-Muller is paying increased dividends by providing maximum utilization of today's expensive raw materials.

If you're caught in the bind between maximum yield and soaring quality control standards . . . can *you* afford to settle for *less* than Controlled Dispersion?

SIMPSON MIX-MULLER® DIVISION

National Engineering Company

654 Machinery Hall Bldg. • Chicago, Illinois

3 way mulling action saves material, coats each grain

. . . KNEADING

Because the mullers never touch the wearplate, you get an intensive kneading of the muller against material grains—through a deep bed of material.

. . . SMEARING

The inside edges of the wheel have a shorter distance to travel than the outside edges to provide a smearing action—across the wide face of the mullers.

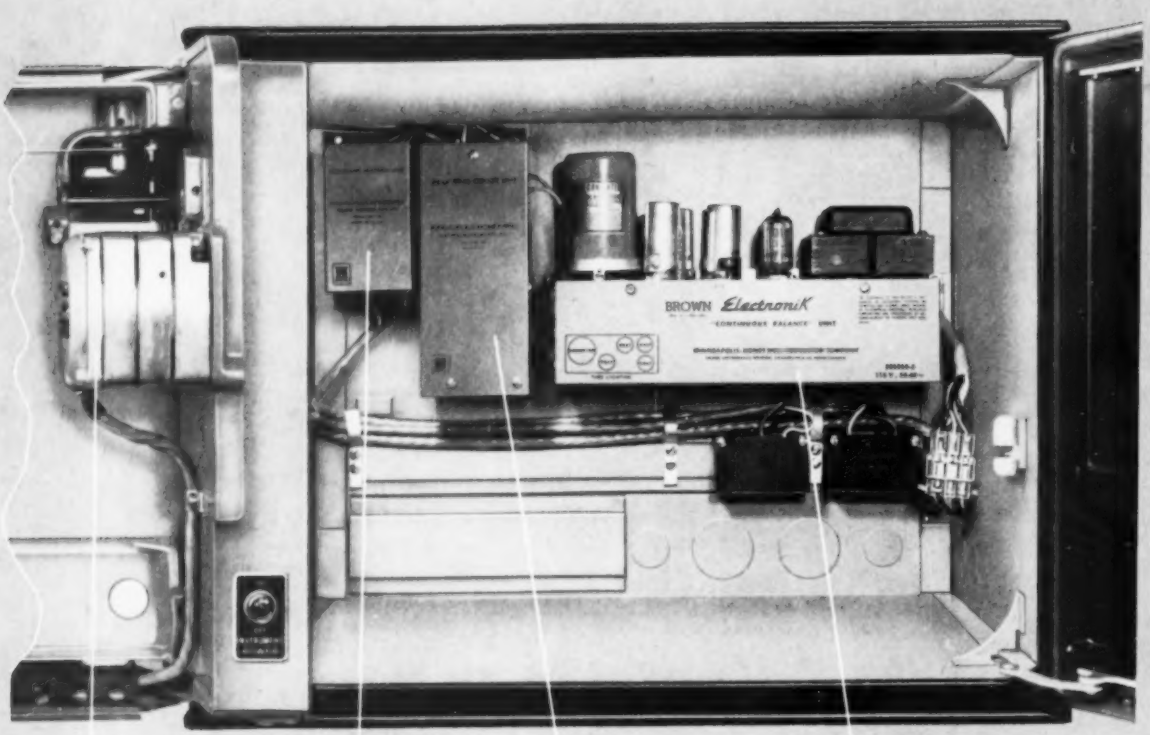
SPATULATE ACTION

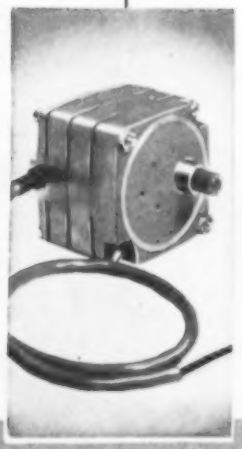
...Note that mullers are set slightly off true radius so that as they roll they also skid sidewards to provide a spatulate action.

. . . THIS IS CONTROLLED DISPERSION

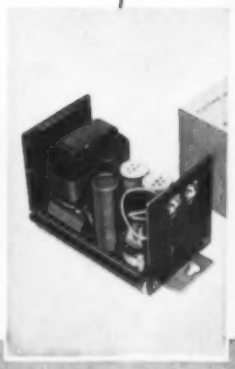
WRITE FOR HANDBOOK

—on mulling. 12-page bulletin explains controlled dispersion—gives details on 9 Mix-Muller models (¾ to 60 cu. ft. batch capacity).

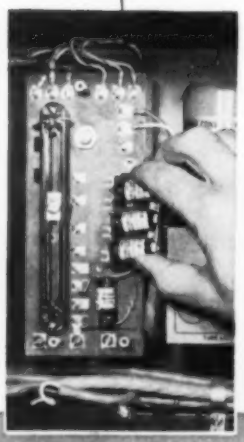




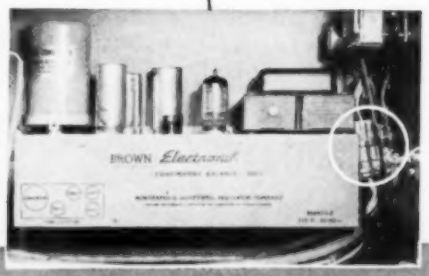
Servo Motor has sectional housing, leakproof oil wick, printed circuits for simplified servicing. Any major part can be replaced in 2 minutes.



Constant Voltage Module—Uses Zener diodes and an ambient temperature compensator to replace standardizing mechanism.



Measuring Circuit Module—Contains easily-changed range spool panels and vernier adjustment. Range is changed simply by replacing screw-clip panels of fixed resistors.



Amplifier Module—Quick-connect design permits fast, easy removal for servicing and replacement. Circle shows quick connect plug.

THESE FOUR NEW FEATURES ARE STANDARD WITH ALL *ElectroniK* POTENTIOMETERS

New modular design...

makes *ElectroniK* potentiometers easier to use and maintain

Now, four great new features add new operating and servicing ease to all *ElectroniK* circular and strip chart potentiometers.

- **New servo and chart drive motors are sectionalized so that any major part can be replaced in two minutes.**
- **A new constant voltage unit replaces batteries, standard cells and standardizing mechanisms.**
- **A new measuring circuit, with quick-change range spools, simplifies range changing and reduces stray pickup.**
- **A quick-connect feature lets you remove the amplifier for service and replace it quickly.**

Now, modular design is combined with the traditional precision of *ElectroniK* potentiometers, to give you a greater value than ever in accurate, dependable measurement and control.

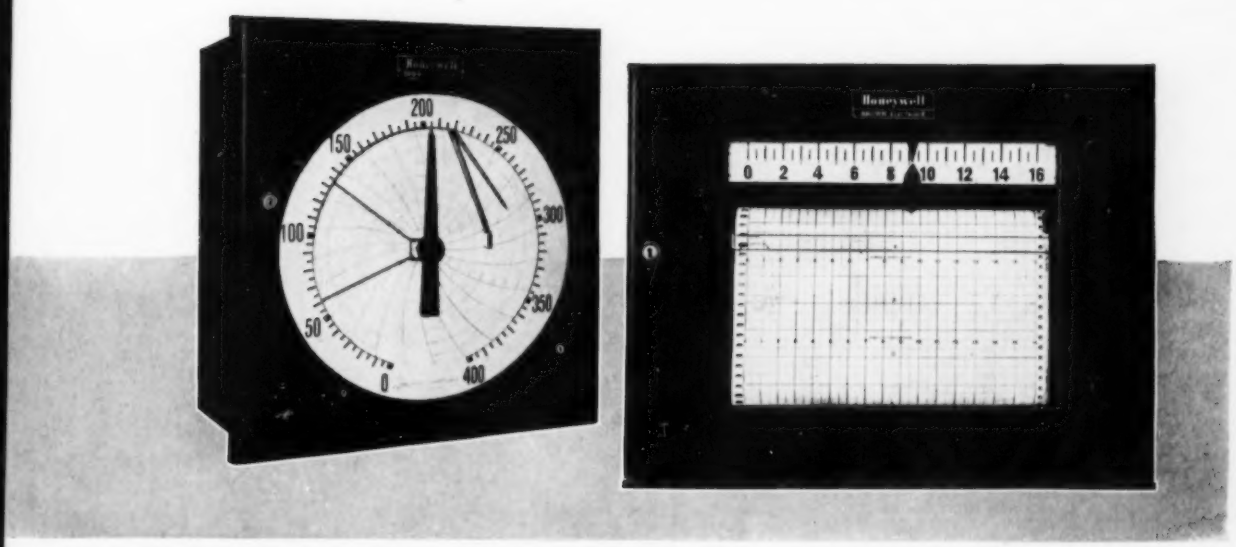
For full details, call your nearby Honeywell field engineer today. He's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

75th YEAR
PIONEERING THE FUTURE

Honeywell

H HONEYWELL *First in Control* SINCE 1885



STAR
SAND—LIME
STRUCTURAL CLAY
REFRACTORIES
If you COMPACT MATERIALS...
controlled compaction is your MOST PRESSING NEED
get it! with...
BOYD
POWER
PRESS
BOYD
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LONG
FILL
INCH
OFF
SINGLE
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CHISHOLM, BOYD & WHITE CO.
A SUBSIDIARY OF WEHR STEEL CO.
610 W. 57th ST., CHICAGO 21, ILL.

Continued from page 72

and methods used in jointing of clay pipe.

Reed reported on the status of studies now being made on the hydraulics of sanitary sewage systems. It is expected that these studies on hydraulics will be extended to include all sizes of pipe. He also reported on the status of important patents that have resulted from research at the NCPMI Laboratory, including patents recently issued and those which are now pending.

A "Research Division" of NCPMI was created to finance the program and to own the results thereto. The Research Division includes those members of NCPMI, acceptable foreign sewer pipe manufacturing companies, and associations willing to support an industry-wide augmented research program.

Under the new Research Division of NCPMI, the research program will, from year to year, be properly balanced between basic and applied research projects designed to give both long range and immediate benefits. To accomplish these planned objectives an enlarged Research Advisory Committee will be appointed encompassing personnel from management, research, manufacturing and marketing fields to insure the continuance of proper balance.

Stress Research

As a further means of accomplishing the objectives, NCPMI unanimously adopted recommendations relative to the administration and financing of the expanded research program as set forth in the "Recommended Program for Augmented Research by the National Clay Pipe Manufacturers, Inc."

D. G. Chase, Chairman, give the report of the Operating Committee.

Chase's report on the recommendations of the Operating and Specifications Committee covered many technical phases such as proposed changes to military specifications, federal specifications, codes, and recommended installation practices. He also reported on the new 100-year Guarantee on vitrified clay sewer pipe and the work now in progress on revising the Clay Pipe Industry Engineering Manuals.

Chase reported on his Committee's recommendations for proposed changes to the 3-edge bearing method of testing longer lengths of pipe, and proposed changes to applicable ASTM specifications. He also reported on the Committee's recommendations on suggested advertising copy dealing with technical matters.

The Operating and Specifications Committee recommended that a more uniform procedure for testing infiltration and exfiltration be developed, and that a suitable specification, based on this uniform procedure, be prepared and later incorporated into an ASTM specification.

He also covered his Committee's recommendations for an improved and expanded method for the inter change of information between the regional offices and the Washington office.

Depletion Study Ahead

M. R. Hardin, Chairman of the Depletion Committee, reported that the Ways and Means Committee had appointed a group of panelists to study the whole depletion matter and submit their recommendations for changes in the law to the Ways and Means Committee. These panelists are now working individually on the entire tax structure of the country and will convene in Washington the later part of November, and will present their report on Depletion to the House Ways and Means Committee on December 1st.

E. M. Lawrence, Advertising Committee members, gave the report of that Committee to the Board of Directors, and the General Membership.

Lawrence reported that the 1960 Advertising campaign was the result of previous meetings of the Advertising Committee in Chicago, Washington and at The Homestead prior to the general membership meeting.

Advertising Expanded

Advertising messages will be directed at more than 18 million readers in 1960, with a broader circulation among architects, engineers, plumbing contractors, home owners, prospective home buyers and taxpayers.

Color ads, in several color combinations, designed to attract 35 percent more readers than black and white ads, will be used for the first time in 17 years of continuous NCPMI advertising.

Special emphasis will be put on wider use of ad reprints, merchandising mailings, and other activities aimed at getting greater use of NCPMI advertising in 1960.

Convention Exhibit Slated

The 1960 Program will include a convention exhibit, featuring factory-made compression type joints, stronger, better and longer lengths of vitrified clay sewer pipe, for use at trade shows.

E. F. Clemens presented the report and recommendations of the Board of Directors to the General Membership, and prefaced his remarks by expressing the feeling of optimism for the future of the industry.

He then reviewed the deliberations of the several NCPMI Committees and the actions taken by the Board of Directors on Wednesday. He also reviewed the expansion and progress made by the industry during the last few years and complimented the members of all NCPMI Committees for their valuable contributions.

The entire membership of NCPMI were guests at a get-together party preceding the NCPMI Annual Fall Banquet and Dance. A. G. Cochran, President and the members of the Clay Sewer Pipe Association were hosts.

Present Prizes

Following the banquet Sherwood Borland, Chairman of the men's golf tournament, and Mrs. Hulda Cochran, Chairman of the ladies golf tournament, were on hand for the presentation of prizes.

F. F. Steele, President, Pine Hall Brick and Pipe Company won first place trophy, donated by August Larson, President, Larson Clay Products Company, and presented by Frank Ortman on behalf of Mr. Larson.

Kiln Car unloading is quick and clean with fork trucks.

Jenkins Brick Co. combines blending, time-proven techniques with result that

Latest Methods Up Capacity 60%

Accurate control of blending, time-proven techniques and the latest developments in modern brick manufacture have been combined in the new Coosada Division of the Jenkins Brick Co. at Montgomery, Alabama.

The new plant representing a 50% increase in total capacity of the company went into operation in August. After three years of planning actual construction had started in January of 1959.

Working with a difficult surface clay, absolute control during every stage of manufacture has been provided in order to insure a high recovery of saleable face brick.

Three pits are worked on 120 acres of clay land located after a general prospecting program. Chosen for particular properties, one of the pits produce a highly plastic, sand free, close grained clay, the second is a

highly sandy clay chosen for control of shrinkage and reduction of cracking and the third is a material that resembles a mixture of the first two. The last is suitable for use alone but the others are not useable. By using three pits the blend can be changed to compensate for changes in the each material as mining progresses.

Recovery is with a Loraine ¾ yard drag line dumping into one of the two 13 yard White "Mustang" dump truck. The useful clay varies from eight to 15 feet in depth.

At the plant the trucks are dumped into two 14 yard bins set over J. C. Steele clay feeders. The driver starts the clay feeder and preliminary grinding plant from the dump site and the system operates until the bins are depleted. A swinging gate set at the end of the screw feeders falls when the bins are depleted, interrupting a micro-switch and shutting down the entire line.

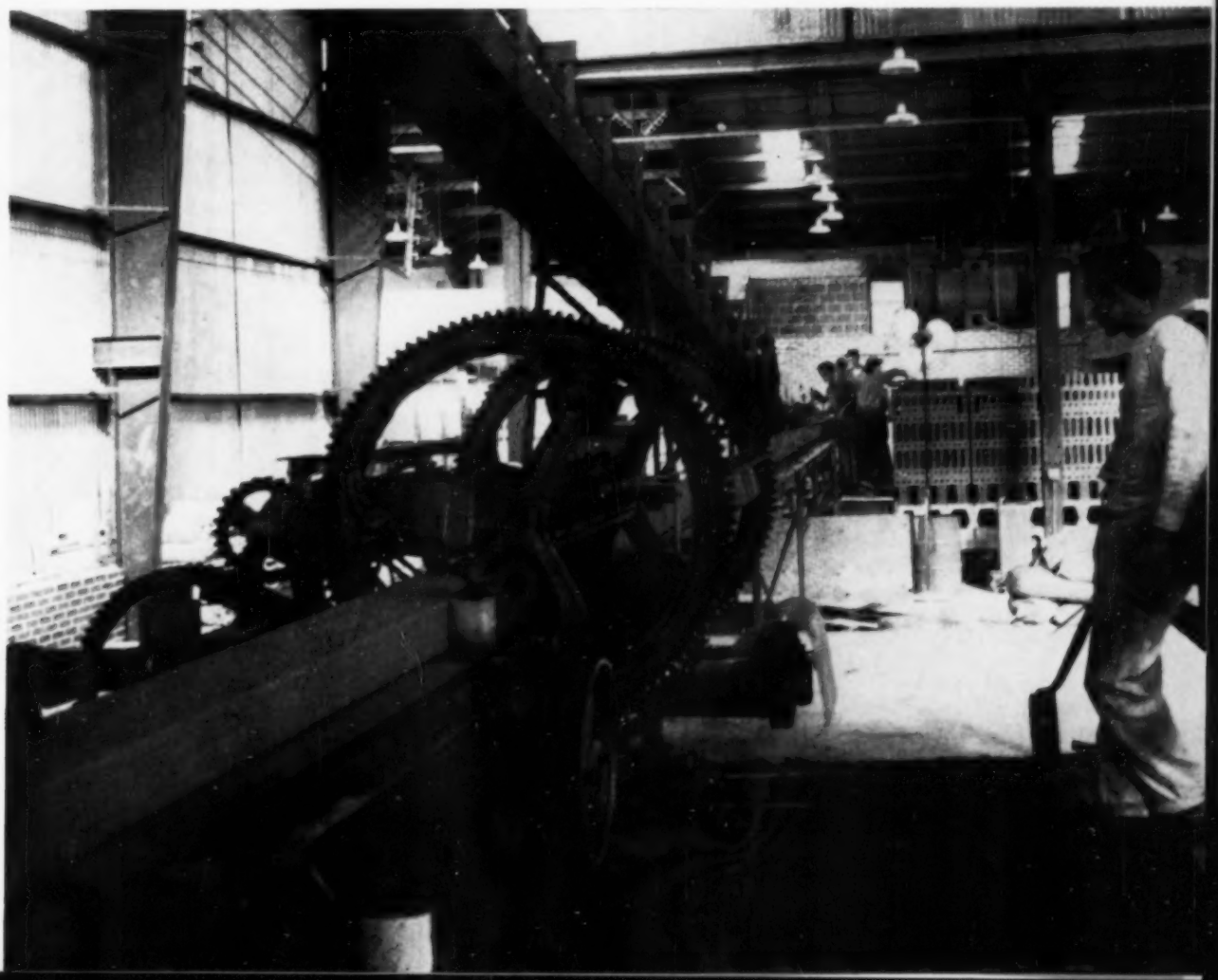
The twin bin-feeder puts 80 tons of clay per hour into the system when it is operating at capacity. The incoming clay is first moved to the primary disintegrator over a 240 foot 18″ belt used to elevate the clay for introduction into this machine. A.J.C. Steele 6A powered with 30 H.P. has been placed in the clay handling system to reduce the clay to small sizes for better blending in following stages.

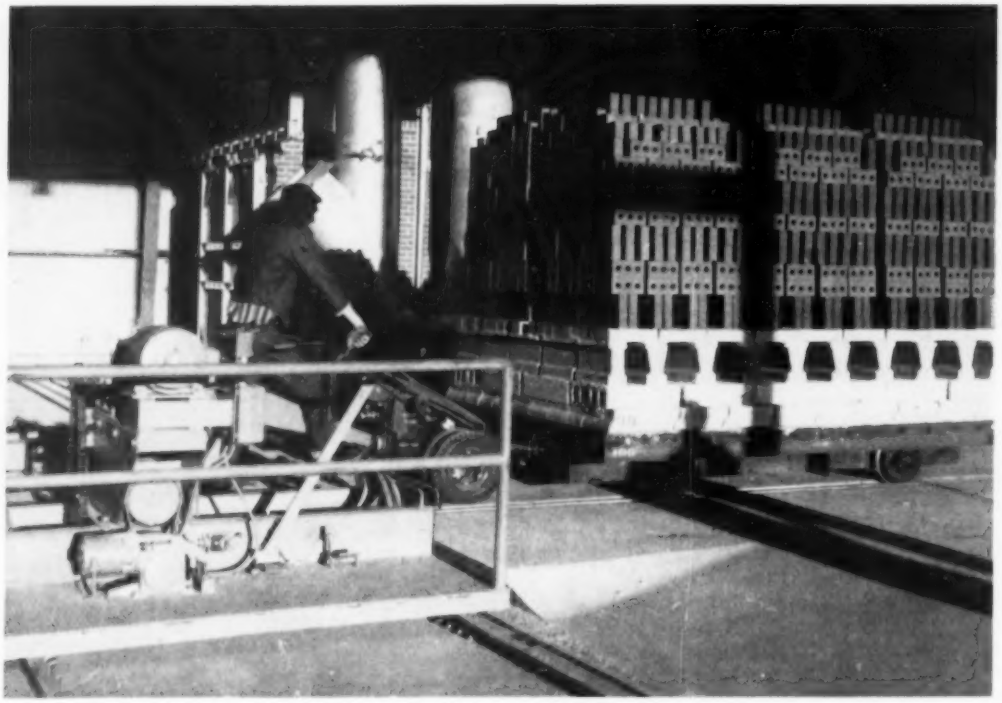
Following initial size reduction the incoming clay is moved by conveyor to the 140 x 120 ft. clay storage building. This unit is arranged so that each individual material is kept segregated in separate piles until it is needed in the processes. Each pile is served by a conveyor set at right angles to the main conveyor running from the disintegrator. Traveling plows are installed on these so that the clay is spread continuously from one end of the stack to the other to maximize the averaging effect of stockpiling. These plows are set in operation along with the transfer plows on the main conveyor when the truck driver hauling material into the plant puts the clay feeders into operation.

These three storage piles contain enough material to operate the plant for two weeks. Current mining capacity is such that three days mining will operate the plant for a week. Each of the closely connected clay pits are worked in turn and until the storage area for that particular clay is filled to capacity.

The clay storage building is a steel frame, iron sheeted structure with a basement under a portion in which the clay feeders for blending are located. When the mill room is in operation the clay is taken from the

Ample room has been provided in the mill room for doubling of manufacturing facilities. Here single man oversees pugging, extrusion and cutter.





Fired brick being moved to unloading area from the discharge end of the tunnel kiln.

storage piles with a one yard Michigan front end loader and placed in one of three bins. These bins are set at floor level and discharged into Steele even clay feeders.

Two of these units are 20 ton per hour units and the remaining is a 12 ton. Discharge gates of these units are calibrated so that any proportion can be set up and later reset as conditioning may warrant. The clay is then moved to the secondary crusher where the three parts of the blend are intimately combined by running through a smooth roll and reduced to final size wth a disintegrator. This belt is a 200 foot unit.

Conveyed to Mill Room

Following this treatment the clay is conveyed directly to the mill room and put into the pug mill. A high pressure constant feed water spray system has been intalled along with a 500 gallon surge tank and solenoid operated shut off valves. After adjusting the clay feeders in the storage area and water addition to pugging operation proceeds with uniform consistency and only requires periodic corrections of a minor nature by the single man assigned to the pugger and cutter.

Return scrap from the off-bearing belt is reintroduced into the pug section only after it has been reduced in size by a Steele scrap chopper. The pugger and extruder are separately driven, the pug with 100 HP and the extruder section with 200 HP. Vacuum is maintained at only 13 inches and is supplied with a 10 HP Nash pump. Dies are oil lubricated and oil is supplied at approximately 100 lbs. pressure with a Hills-McCanna oil pump. Like all other major machinery in the mill room a #18 cutter equipped with an "A" reel is used and the off-bearing table extends from the mill room into the main building across four loading tracks. All of the major mill room machinery was supplied by J. C. Steele Co. as were the major pieces of preparation equipment.

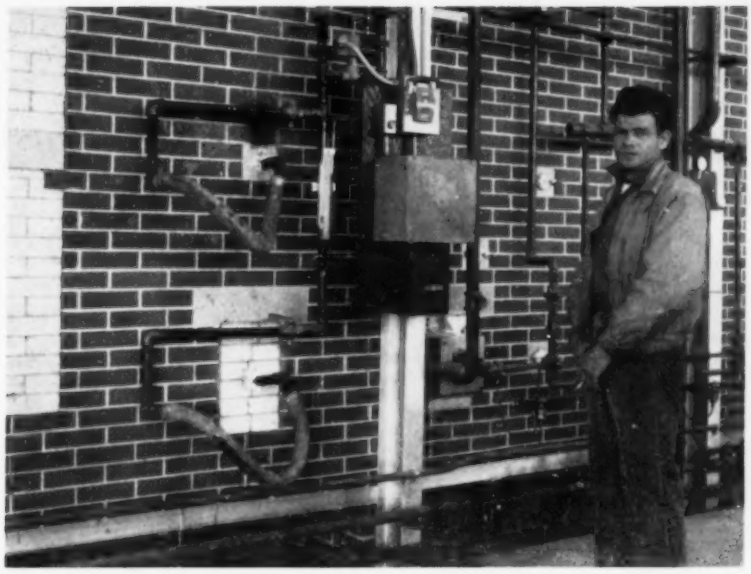
Use Six Off-Bearers

Six off-bearers are used to handle the daily production of 80,000 brick. The nine by seven foot tunnel kiln cars have the open grill top block system. They are pushed through the setting station with hydraulic pushers after being set with six fork sized cubes of 520 brick set 14 high or a total of 3,120 for the car. Accurate spacing of runner brick by the car setters is insured by guide marks of iron oxide on the tops of the cars. These lines were placed by using a stencil and brushing a water solution of the oxide onto the top block before the first firing. This becomes a permanent stain after the first firing.

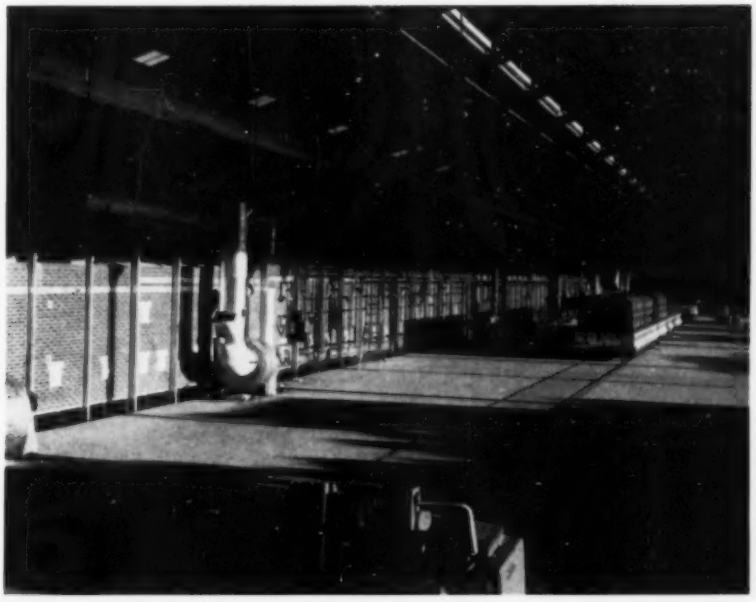
Being extemely sensitive to unbalanced drying the brick are set in a conditioning room as soon as possible after they have been placed on the car. This is a steel frame aluminum clad 120 x 36 ft. room which protects the green brick from drafts and extremes of temperatures from the time they are made until they are transferred from the holding room to the two track drier with the Engineering Associates transfer car.

The main building at Jenkins is 520 by 78 feet and houses the Swindell-Dressler tunnel kiln. The twin tracked Robinson Ventilating designed drier, the conditioning room as well as the four tracked car setting area and loading area for those trucks which can be loaded directly from the kiln cars.

The mild Alabama climate has allowed the plant designers to leave one half of one side of the building open and this section has a cantilevered roof extension allowing an exception-



Plant superintendent William Taylor checks the automatic flashing equipment at the end of the furnace zone.



Over-all view of the tunnel kilns also indicates the generous proportions and dimensions allowed for the mechanical handling of fired ware from the tunnel kiln cars to the storage area.

ally big area open to the light, and clear of floor obstruction. Construction of this phase of the program was with steel truss and aluminum sheeting and was handled by Varner. Among other features it has a ridge ventilator running the length of the tunnel kiln and special treatment of sheeting over the combustion section of the kiln.

Modern Brick Drier

The drier represents a most advanced design of modern brick driers, a condition imposed by the diffficult material with which this division must work. It holds 15 cars in each of its two tunnels and features control of air volume and temperature through automatic controls. Warm air is taken from the cooling end of the tunnel kiln and moved to a mixing box set in front of the end of the drier. The mixing box takes outside air and blends it with the warm kiln air in order to increase the volume while an auxiliary burner increases the heat level to that required by the system. The dry bulb temperature on the hot end of the drier controls the amount of heat added and the wet bulb changes the damper setting on the 10 HP exhaust fan and the louvers on the mixing box to control the total volume of air moving through the drier. A three HP fan on the entrance end of the installation also helps to maintain a controlled air volume.

Four recirculation fans are installed on the top of the unit to maintain three sections of manual control in the tunnels. Each of these ten HP units are fitted to move the air in a generally horizontal path through the setting and each set of fans move the air in opposite directions in order to more adequately control and segregate the zones.

A one and one half HP blower is used to supply air to the under side of the cars in the drier to protect the Timken roller bearings from the 375° temperature of the hot end.

Losses Extremely Small

In spite of a shrinkage of over 15% in the drier, the drying has been highly satisfactory and losses have been held to a small fraction of one percent. Differential movement of the six cubes on the car sometimes re-

quires dressing the setting and the consolidation of the cubes to recover their original stability.

Several new features have been included in the tunnel kiln, again designed to compensate for the difficulties that are experienced with the raw material. The kiln is 285 feet long and includes zones for recirculation, preheat, furnace, rapid cool and ware cooling. An entrance vestibule has been provided to prevent the charging operation from upsetting the balance of the kiln during this operation. A heating system is installed over the vestibule to insure a high temperature at the entrance end. This is a dutch oven arrangement, protected with flame out equipment and controlled automatically to maintain any set temperature.

At charging time a guilliotine door is dropped cutting the vestibule off from the rest of the kiln and then the car is pushed into the compartment, the outside door closed and only after the guilliotine door is raised the hydraulic pusher circuit closed to allow the normal push of the train to continue through the kiln.

Devoted to Low Temp

The first 45 ft. of the kiln are devoted to a low temperature recirculation zone, and this section is followed by 40 ft. of pre-heat which has 15 excess air burners installed on each side. This section of the kiln is under manual control. All of the Hauck burners are set at hearth level and can be readily switched from gas to #2 oil. Four automatic control sections are provided for the 63 ft. furnace section. Generally a top operating temperature of 2160° is reached in the last control area. A 10,000 gallon oil tank, enough for three days firing, has been installed for standby use.

Four Leeds & Northrup indicating and recording controllers are used to control proportioning valves. Each set includes 12 burners, six on each side of which four are set at the hearth firing under the brick on the open grill tops and the remaining two set high to act as crown burners.

Install Flashing System

A flashing system has been installed at the end of the furnace section and operated with automatic valves to cause an intermittant flow of gas through six ceramic lances. The duration of the gas flow and the time cycle can be changed to suit any requirement.

The fast cooling zone is equipped with ducts for bleeding clean air from this area into the combustion or furnace zone if required as well as indirect and direct cooling. The exit end of the kiln is supplied with pressure controlling fans and ducts to control both volume and recirculation of air in this end to meet precisely the cooling area desired.

Kiln Car Cube Unbroken

On discharge the fired brick are moved on storage tracks where the six cubes are taken with the Bickerstaff equipped Clark fork trucks and set on trucks for sorting and loading or carried to storage area and set down. The kiln car cube is left unbroken until the brick are actually set out for shipment. In the case of local deliveries pack huler cubes are built up on the yard. As a large proportion of Coosada division brick are expected to move by rail a long dock has been provided for car loading.

Production from the new unit will be used to supplement that from the old plant, that is each plant will produce a distinct line of brick with Coosada division producing only face brick with new textures. According to Harry Meeks, Company, President, tile production will be expanded at the old plant and all common brick will be produced there. The new division was put into operation by Superintendent Bill Taylor, Jr., under Meek's direction with a completely unexperienced crew. The plant was built under a general contract with Swindell-Dressler who also made the preliminary engineering studies that provided the information for an economic justification of the expansion program. The general contractor also prepared the plans for the plant in consultation with Meeks who had made a intensive study of plants operating under similar conditions throughout the country, and was also able to bring his many years of experience with the parent plant into use.

Burtrum Ferber was the resident engineer for S-D on the construction phase of the project.

Kiln cubes are culled and graded as they are loaded on trucks for shipment.

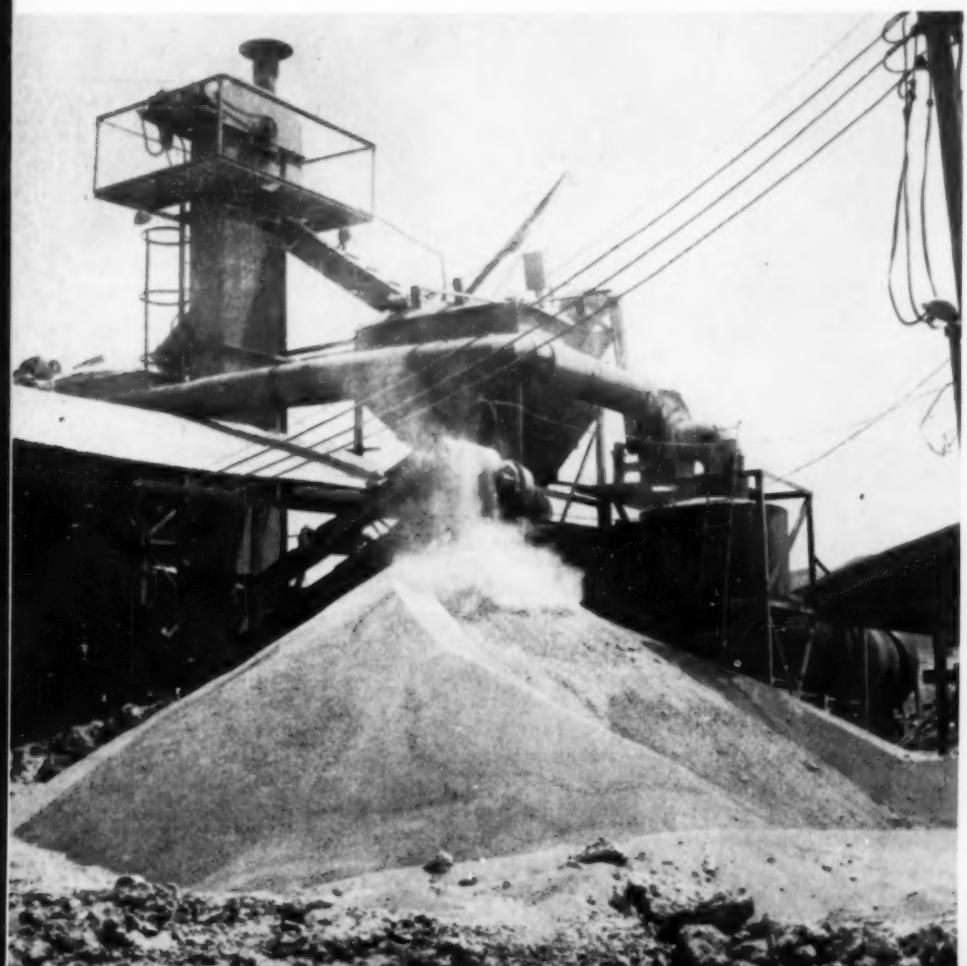
Surface Clay Replaces Natural Gravel As

Texas Company Makes New Clay Product

Surface clay, burned in a rotary kiln but not bloated, has been developed by the Calag Co. of Sulphur Springs, Texas as a replacement for natural gravel in road construction in that area. Accepted by the Texas Highway Department for use in highway bases, the fired clay promises to be competitive in cost in many other areas throughout the United States where natural gravel is unobtainable. Cost is significantly less than stabilization of soils with asphalts or cement.

The plant in which the new aggregate is produced has been developed as a prototype by the company and is portable so that it or similar plants could be moved by truck to the location of any highway construction in order to bypass high transportation costs associated with distant shipping of gravel. Currently many local projects have used the fired clay aggregate and proven its suitability for road construction.

The business was originated as a result of a research program in District #1 of the Texas Highway Department. Good road materials are not available in most of the nine-county district. The research program was conducted by H. F. Ball, Laboratory Engineer, under direction of L.D. Cabaniss, District Engineer, in an effort to develop new materials and techniques to reduce the



All material under six mesh is removed from the system between the drier and kilns and discarded. This in addition to dust collection system shown reduces the dirt nuisance of the plant.

high cost of roads. This particular investigation, at the suggestion of Mr. Cabaniss, began with a study of burned clay railroad ballast, widely used some 50 years ago. The investigation indicated that a good road aggregate could be produced by burning surface clays and would be economically feasible in many areas of Texas. The Research Board of the Texas Highway Department recommended that the results of the investigation be made available to private capital for development.

Howard Hicks, former owner of the Thermo Fire Brick Co. of Sulphur Springs, was contacted by Ball and a pilot plant operation was conducted, confirming the results of the laboratory investigation. This led to the building of the present Calag plant that is jointly owned by Ball, John Rhodes and John Hicks the son of Howard Hicks. Application has been made by Ball and Hicks for patents covering road utilizing burned clay.

Compositions

Surface clay is used for the process and is won on the site of the plant with a Hancock self-loading pan which is pulled with a standard John-Deere rubber mounted tractor. The clay is moved to a 50 x 100 foot storage shed with the pan and dumped during dry conditions. The mining campaign has been planned so that the resulting pit is self draining and the clay exposed dries rapidly after inclement weather. The company has tested many common clays in Texas and has found them useful for the process.

Once in the storage shed the clay is handled primarily with a Saureman slack line bucket system. An International T-D 9 is used to clean up odd places in the shed that the slack line will not reach and for other utility work around the plant.

One man can feed the process and tend the serrated rolls and scalping screen that make up the initial processing section. After being cut to proper size the raw clay is moved with a bucket elevator to a bin from which clay is taken with a belt feeder and put into a 6 x 40 foot rotary drier. In this unit free moisture is removed from the clay.

The drier is powered with 30 H.P., is equipped with internal "lifts" to expose the clay to the maximum effect of the drying air, and is trunnion driven. Heat for drying is taken from the twin kilns. Dry clay upon being discharged from the drier is elevated to a double deck Universal screen. All pieces over 1½ inch are diverted to a serrated roll for further crushing and all material under six mesh is removed from the process and discarded. The material going to the serrated rolls is recirculated through the screen circuit.

The material that ranges between six mesh and 1½ inches is then elevated to two storage bins that serve as surge bins between the drying process and the firing.

The rotary kilns are 6 x 50 feet and are each trunnion driven, with 15 H.P. motors connected through variable drive speed gear boxes. These units were supplied along with the drier by the Longhorn Construction Co. Using gas as fuel, the temperature is maintained at a level where maximum density of the clay aggregate is developed. With the particular clay being used in the Sulphur Springs location this is approximately 1850°. After firing, the hard aggregate is allowed to fall in shallow pits and then removed from the immediate kiln area with a drag conveyor. The stacks of aggregate are then moved on into the storage area with an Allis-Chalmers rubber tired front end loader.

The aggregate is allowed to cool naturally in the open air. As contracts for road work call for large tonnages of aggregate the storage pile is built to tremendous dimensions between jobs. When needed to fulfill a contract the fired clay "gravel" is loaded with the plant's equipment into contract haulers trucks for movement to the job site.

General plant view shows twin kilns, feeder bins and drier as well as drag conveyors and storage piles.

Thomas Payne, plant superintendent and Howard Hicks original supporter of the Calag process.

Once again the time has come for the annual 1960 award contest for the best papers on refractories. The awards are sponsored by TRI. Winners will be announced at the yearly meeting at the Homestead, in Virginia in May. Listed below are the full details.

THE REFRACTORIES INSTITUTE
1960 ANNUAL AWARD CONTEST
FOR
The Best Papers on Refractories

The Factory Operators Committee of The Refractories Institute presents the terms and conditions of the 1960 Annual Award Contest for the best papers on any phase of refractories.

1. Who may participate? All hourly or salaried employees, except officers, of Active and Associate Members of The Refractories Institute are eligible to participate.

2. What are the subjects of the papers? Papers submitted for the contest may pertain to any phase of refractories, such as, but not limited to, raw materials, production methods, testing, research and development, training programs, safety, industrial relations, management techniques, etc.

3. How shall the papers be prepared? The papers should be limited to not more than 2500 words. Three unsigned typewritten copies of each competing paper must be submitted to reach the office of The Refractories Institute, First National Bank Building, Pittsburgh 22, Pa., not later than February 1, 1960. A letter must accompany the manuscripts giving the author's name, company address and title.

4. What are the awards? The award will be an engraved wrist watch, valued at $100, to be given to each of three men who submit the best papers, as selected by the judges. The authors of each of the prize winning papers will receive their awards at the 1960 Factory Operators Meeting. Text of their papers will be printed and distributed to the membership.

5. Who will determine the winners? The judges for the contest will be representatives of industry trade publications. Their selections will be made without prior knowledge of the names of the authors by having a code number assigned to each paper before submission to the judges.

A Brick & Clay Record EXCLUSIVE . . .

Semi-Automatic Machine Packages 80,000 Brick per Day

Only Eight Men Required to Handle and Strap the Packaging Machine Production At Owensboro, Ky. Brick and Tile

By Elmer Spain, Technical Editor

Mechanical handling, automatic strapping equipment and close supervision have resulted in a high degree of efficiency on the yard at Owensboro Brick & Tile Co. at Owensboro, Ky. The managers of the plant, early users of the 500 brick strapped cube and the Superlite unloading system, were concerned with the shortcomings of the jig-formed cube and contacted its suppliers for proposals to streamline the strapping operation and eliminate as many of the bugs in the system as was possible.

After an intensive study of brick movement on the yard from kiln to loading area a machine was designed and built by Link Belt. This machine composed of many standard components from Link Belt's catalog as well as several specially designed features together with semi-automatic strapping equipment from Acme Steel Co. and several specially designed features, has eliminated loose straps and increased the efficiency of color blending.

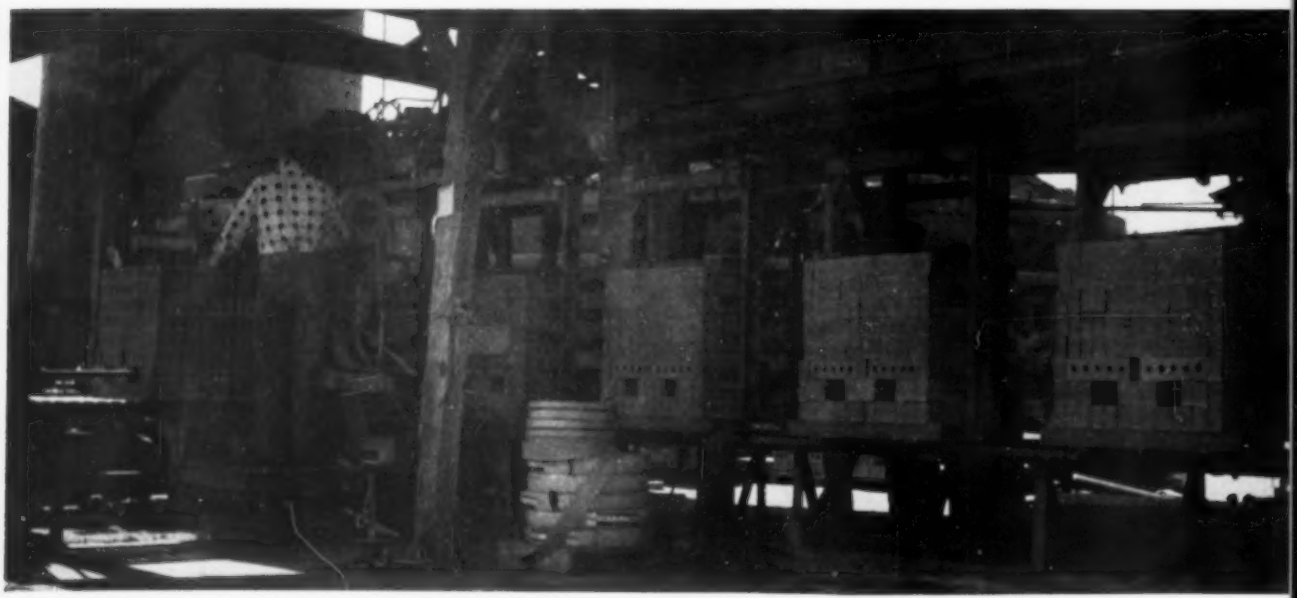
The packaging machine as supplied at Owensboro is rectangular in shape with a short leg on conveyor set at right angles to one long side. This short conveyor is the portion of the machine where the brick packs are tightened, strapped and held until removed with a fork truck.

Thirteen jigs are suspended from overhead trolley conveyors. Each jig will accept 100 brick, either eight inch or 12 inch. As the jigs move around the machine they are loaded manually from stock cubes and when each carrier reaches the strapping leg, the power drive is stopped and the pack is pushed out of the carrier. The speed of the machine is variable. Currently 80,000 brick are being packaged a day at the plant. After a year's operation during which minor difficulties were worked out and the design tested, the machine has received approval of both plant managers and workers.

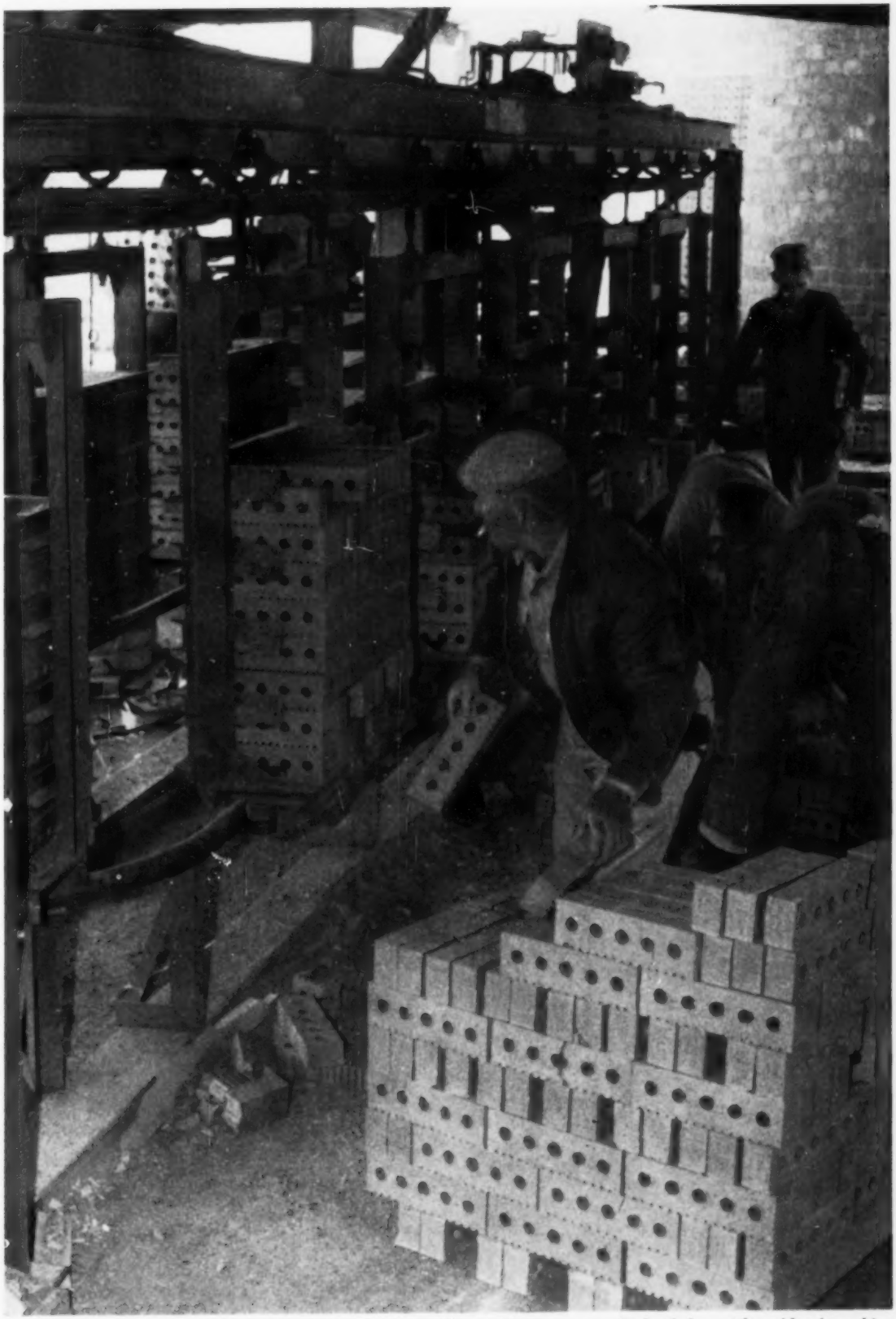
The trolley drive is hydraulic, while the same hydraulic system furnishes power to move the brick from the carriers into the strapping section. Acme Steel Co. air power tools are used to actually strap the brick and seal the package.

While the machine has reduced labor required for the packaging process, attention to material flow before and after packaging has contributed a great deal to the economy of the Owensboro operation.

Either of two options are open to the yard foreman as he sets up a daily strapping schedule to make the



Below-Semi-automatic strapping machine is located at left and is operated as loaded jigs are moved past station.



Moving Jigs are manually loaded on either side of machine

most advantageous use of his outgoing orders and unloading kilns. He can take kiln cubes directly from the kiln with a Bickerstaff equipped fork truck and deliver the cube to the strapping machine, or if required, deliver the kiln cube to storage, pick up a cube of different color or texture from the storage area and take this brick to the strapping machine.

The kiln cubes are placed around the periphem of the strapping machine. Space has been provided for nine or ten cubes and by spotting the proper shades in the line any percentage blend of different colors that might be desired can be set up. At Owensboro the color problem is one of getting a uniform blend throughout the package with a kiln run variation in the pink color for which the plant has become known. Since each 100 pack is made up from as many as ten kiln cubes, the blending is both complete and uniform from one package to the next. This has resulted in a decrease in service problems caused by spotty walls encountered in the old system.

Tensioner and sealer are air driven units supplied by Acme Steel.

Off-bearing truck is equipped with standard twin prong steel fork.

Five men are assigned to the loading side of the packaging machine and cull out all broken or chipped brick from the cube kiln as they load the jig. Each man puts 20 brick into the carrier as it passes his station. Rate of travel is controlled through a speed control and any time sequence can be set up and the machine will maintain the selected rate. Travel is intermittent as the drive chain is stopped during that part of the cycle when the 100 brick in the jig are pushed from the jig into the strapping portion of the machine. The transfer of brick is with a hydraulic operated ram set on the inside of the conveyor section which contacts the 100 pack with slats advanced through slots located in the back of the carrier.

Enters Compressing Section

Emerging from the jig the pack of brick enters the compressing section of the strapper. In this section an adjustable plate on the one side of the conveyor and a set of spring loaded fingers seven deep on the other, compress each course of brick to substantially complete tightness. As the packs are forced through this section one at a time paper is placed on the corners of the pack from continuous rolls. Feed is automatic and the four rolls of paper are so located that the reels can be replenished with a minimum of down time when this is required.

Immediately following the compression section of the strapping portion of the machine the steel strap is applied. Using a $\frac{1}{8}$ x .023 gauge steel strap applied with an electrically driven strap feed and an air operated combination tensioning and sealing tool, one man can strap a maximum of 155 packs an hour. While a total daily production of over 100,000 brick is indicated the plant production at Owensboro combined with a normal shipment of 20% of unstrapped brick requires a daily production of 80,000 strapped brick.

Mechanized Superlite unloaders and fork trucks are used in all handling after brick are put into the 100-*packs.*

The paper on the corners of the cubes serves two functions. It acts as a cushion to prevent the sharp corner of the brick from cutting the strap and also ties all of the packs together into a solid line of strapped brick.

Tear Paper as Truck Lifts Cube

When the packs are advanced to the end of the conveyor the offbearing fork truck, equipped with standard steel pallet forks, takes five of the 100 packs from the

Continued on page 113

In Rough Terrain . . .

Fire Clay Prospecting With Back-Hoe and Core Drill

By
J. D. Haines, Jr. and J. R. Hudson, Jr.
North American Refractories Co.
A Refractories Institute Contest Paper

It is our purpose in this report to show the advantage of using the method of prospecting suggested by the title. We feel that it would be advantageous to outline the conditions which made necessary the adoption of this method of delineating or defining a clay area. We realize that the outlining of a crop line is nothing new, but we feel that the method used was very useful and quite economical. Although it was evolved for a particular situation, it could be adapted to many prospecting situations. This will be true, even though conditions may not be as adverse as they were in this case.

The property which was prospected, using the method suggested above, it situated in a very mountainous area, entirely undeveloped and covered by heavy brush and small timber. At the time the prospecting was done, it was inaccessable by any modern means of transportation except by "Jeep".

The tract of land under discussion is composed of two contiguous parcels. The Southern parcel, containing 310 acres, and the Northern parcel, containing 476 acres, straddle the Chestnut Ridge Anticline in a North and South direction.

It had been determined by several reconnaissance trips over the terrain on foot, by plotting the area on a U. S. Topographic Sheet, and with a knowledge of clay deposits in the general area, that this tract held a good possibility of containing a reasonably large quantity of good conglomerate or Mercer Hard Clay. This was contrary to evidence contained in the reports of several reputable clay men who had examined the property during prior explorations covering many years.

In June 1956, our company secured an option to purchase the clay on this tract, in place. The option period was for one year and the purchase was contingent upon an estimation, by our Mining department, of the merchantable and profitably mineable clay in the tract. The areas containing the clay were to be marked *on the ground* and *only* those areas so marked were to be purchased. The purchase was to include nothing but the clay, with the right to remove. It is important, for the purpose of this paper, to emphasize that under such conditions it was necessary to use a prospecting method which would leave no room for doubt as to the quantity of clay contained in the defined areas.

Find Rugged Terrain

Prospecting was begun on Southern tract early in 1957, and when it became apparent that, due to the rugged terrain, drilling could not be completed in time to meet the expiration date of the option an extension of time was secured. This was later supplemented by a further extension to June 1958, containing the express stipulation that no further extension to June 1958, containing the express stipulation that no further time would be granted and that the option would have to be exercised or released. By December 1957, we had completed prospecting the Southern parcel entirely by core drilling which left the 476 acre parcel to be prospected in a period of six months. Using conventional methods this would have been practically impossible, particularly, since at least three months of that time would present adverse weather conditions. Considering the slow progress made up to that time and the necessity of the close spacing of the drill holes, it was felt that a method of prospecting which would combine the advantages of core drilling and hand prospecting would need to be used. One could supplement the other by outlining the crop line and determining the extent of the clay body in one continuous operation. The big problem was to hit upon some rapid method of crop prospecting which would not make our costs prohibitive. At the same time we wanted to be sure that our results were positive and could be properly interpreted.

In searching about for a solution to the problem, we hit upon the idea of using a back-hoe to uncover the clay measure at the crop line so that it could be properly sampled. The possible clay area in the tract, as determined by drilling one or two inital exploratory core drill holes, lay on the top of the ridges which are fairly flat and rather wide and whose sides fall off toward the streams which drain the area rather precipitiously in many places.

Continued on next page

The highest land in the area rises to an elevation of approximately 2250 feet above sea-level. The surface is generally rough and uneven due to the presence of large boulders and blocks of remnants of the Homewood sandstone. The Homewood sandstone represents the most prominent geologic feature on the property and was a very valuable key in the prospecting of the area. The Allegheny series has been almost entirely removed from the area by erosion. Weathering of the sandstone which covered and concealed the lower measures containing the clay made the job of locating the outcrop of the Mercer horizon exceedingly difficult.

The Mercer formations, which were the primary object of this investigation, lie directly under the Homewood sandstone. In some places a black or gray shale separates the Homewood and the clay, and in others the clay lies directly under the sandstone.

Since the location of a profitable strip mining area was our primary objective and the available time was limited, it was decided to make use of a back-hoe to assist in the search for the clay body in the Northern parcel.

Not having had any previous experience with the use of this type of equipment for this purpose, we underestimated the requirement of this job. Initially we attempted the use of a small back-hoe mounted on a Doge Power-Wagon with a power take off. This was settled upon because we felt that it would require a mobile piece of equipment which could negotiate the rough country which would be encountered, and the Power-Wagon, we thought, would solve the problem of mobility. We soon found, however, that the equipment was not large or heavy enough to handle the rough job expected of it.

Consult Specialists

We then consulted a firm specializing in the use of heavy earth moving equipment. After their men had examined the terrain we settled upon the use of two pieces of heavy equipment, namely a D-7 Caterpillar tractor with a rear-mounted, cable-controlled back-hoe and a D-8 Caterpillar bulldozer. The back-hoe was capable of digging vertically for 13 feet. The D-8 bulldozer was intended for building access roads and for leveling off areas to be prospected by the back-hoe. As it turned out, however, the "dozer" became a very necessary part of the operation for uses other than those we had originally intended for it. The 18 to 24 inch snows and high winds with which this section is plagued caused not only our access roads but the main roads into the section to drift almost continually. It became necessary to use the bulldozer to keep the roads open for our men and supplies to get into and out of the prospecting area.

During the exploration of the Northern parcel a total of 43 holes were opened by the back-hoe along the clay outcrop. These were backed up by 77 diamond core drill holes which were spaced at distances varying from 100 feet to 250 feet back of and higher than the crop line. After two preliminary exploratory holes were drilled to establish the elevation of the clay horizon, these drills worked behind or followed the back-hoe.

When the elevation of the clay horizon had been determined, the bulldozer cleared off and leveled a space for the back-hoe to operate. Experience soon showed us that for best results the back-hoe should be located on the high side of and at right angles to the outcrop.

Take Samples

As each hole was opened to the bottom of the clay measure, a representative of our Mining Department was on hand to sample the measure. Samples were taken of each foot of measure, placed in separate containers and given to our research laboratory for analysis and evaluation. Each hole was then back filled after an elevation of the top of the clay had been transferred to a convenient bench mark by hand level. A stake was also placed at the face of the clay measure for later location by survey and an aluminum numbered tag was placed thereon for proper identification.

While each hole was being opened the bulldozer was opening a road and preparing the site for the next hole. Each new site was selected by a member of the Mining Department who spotted the new hole using a hand level. Holes were spaced from 100 feet to 250 feet apart although the exact distance between the holes was not pertinent as was the elevation in such locations.

The use of the bulldozer to remove some of the surface debris and to prepare each site enabled the back-hoe to dig to a depth of from 3 to 8 feet farther below the level of the original surface than the 13 foot limit mentioned earlier. The advantage of this is obvious when we consider that the measures are subject to local dips and raises and that the use of a hand level in spotting locations gives only a general elevation location. This method obviated almost entirely the necessity of moving up or down hill to uncover the clay measure in any one spot. The use of the back-hoe also enabled us to uncover the clay measure in such a manner as to provide a "face" or wall of clay for easy and accurate sampling.

Use Diamond Core Drills

As the back-hoe prospecting progressed, two diamond core drills, producing 2¼ inch cores were put to work following the back-hoe. These holes were located so that the area could be adequately explored and clay areas properly defined.

The clay cores were boxed and later quartered and a sample of each foot was given to the laboratory for analysis, evaluation and classification.

As the exploration progressed, another advantage of the back-hoe method became outstanding. As most clay men know, in the outcrop area of a clay measure the clay is likely to be broken and scattered through the debris of the surface. This is particularly true when the crop is concealed. If core drilling alone is used, quite often the driller is unable to get a full and true picture of the measure without redrilling far enough back of the crop line to obtain a solid core. This condition was true in the area in question since erosion of the overlying sandstone had littered the surface with boulders and filled small pockets and hollows with sand. This condition made it extremely hard to crop drill and was one of the reasons for our slow progress on the Southern parcel.

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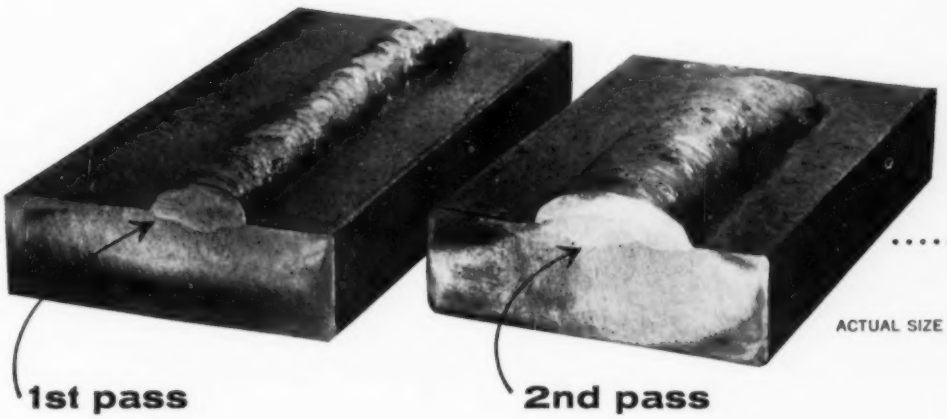

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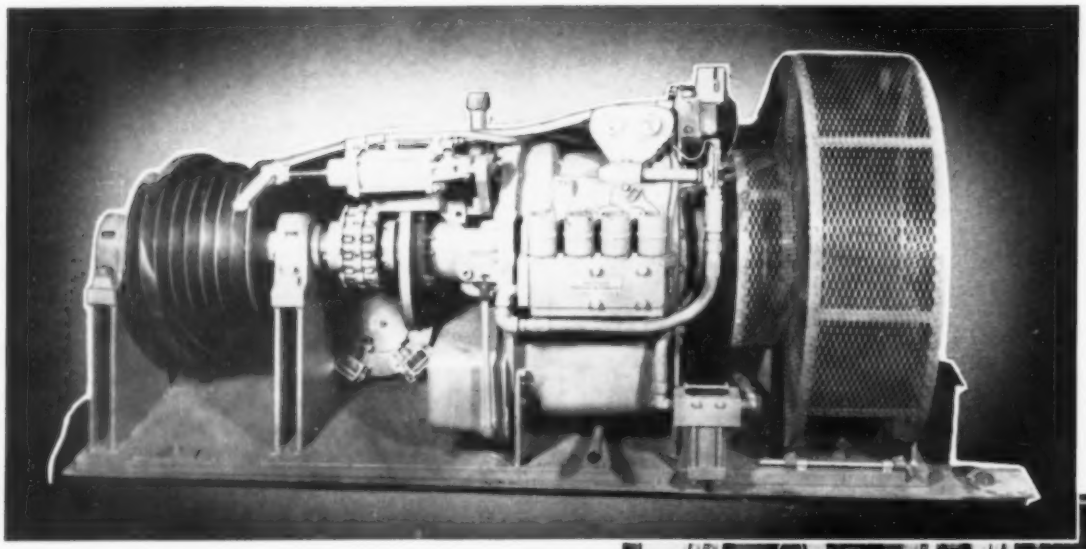

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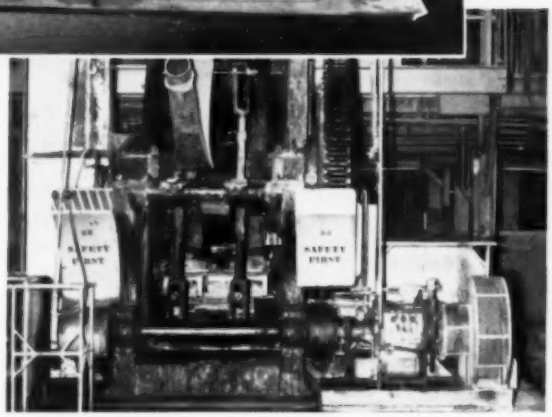

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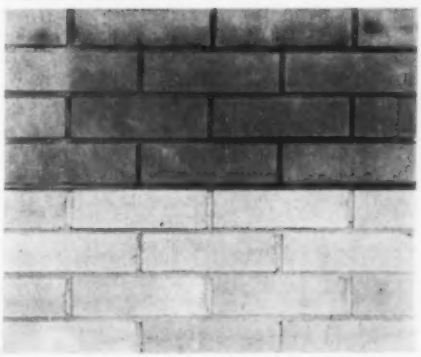


Test wall after six months' exposure in northern climate. Top four rows are badly discolored. Bottom four of identical brick were treated with Silaneal by the brick manufacturer.

New Silaneal Treatment Gives Brick Lasting Beauty

Here's a discovery that's boosting brick sales throughout the country. It's Silaneal®, the new plant-applied sodium siliconate treatment that gives brick lasting beauty . . . keeps even your most delicate hues clean and free of discoloration. And as if this weren't enough, Silaneal also helps you lower the suction rate of high absorbency brick to a controlled optimum. In short, Silaneal gives brick more sales appeal!

Silaneal accomplishes so much because it makes brick water repellent. And water is a chief source of staining trouble. Water carries soil, soot, and other dirt into brick. Also, water leaches salts from brick or back-up materials, and deposits them on the surface, forming efflorescence. By causing brick to shed water, Silaneal stops these problems at their source . . . virtually eliminates staining. Treated brick stay clean in storage and after installation in all kinds of climates.

Silaneal helps speed construction, too. Controlled suction rate means proper hydration. Mortar stays workable longer . . . brick needs no soaking. More mortar can be spread at a time, and more courses laid before the joints are struck. Cleanup is generally reduced to a simple brushing; the need for acid cleaning is minimized.

Low cost Silaneal is easy to apply by dip or spray methods. It's nonflammable and water-dilutable — there's no fire hazard. Silaneal has been evaluated in tests prescribed by the Structural Clay Products Research Foundation, and thoroughly field-proven in numerous buildings.

. . . For complete information about Silaneal, phone or write the nearest Dow Corning office.

SUSTAINING ASSOCIATE SCPI

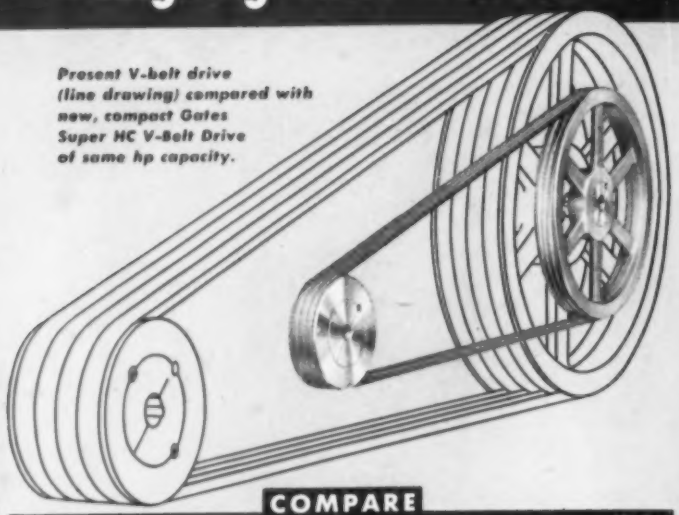
first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

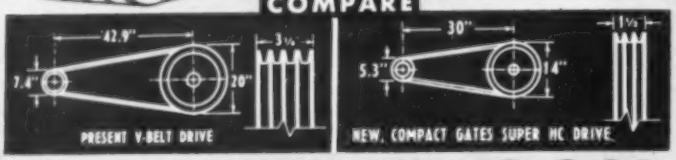
ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

Designing NEW DRIVES?

Present V-belt drive (line drawing) compared with new, compact Gates Super HC V-Belt Drive of same hp capacity.



COMPARE



Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.

The Gates Rubber Co., Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ont.
World's Largest Maker of V-Belts

TPA 439

Gates SUPER HC V-BELT Drives

Below is another statement contributed by a refractories executive. Space limitations prohibited the inclusion of it in the refractories section. We are printing it as another indication of the optimism existing in the refractories industry. This statement is by E. W Beck of the Ferro Corp.

Ferro Builds Extra Capacity for 60's

The past ten years in the refractory field has been a period during which there have been major developments in improved refractory materials. Our field of special refractories covers only a small portion of the total field. This period, however, has been one wherein we have concentrated on the development of better body materials so that improved performances could be obtained with respect to greater sag resistance and units that would have better thermal shock characteristics. This has been a continuing engineering program, and, with it, has been coupled a new and broadened approach to the design of the products themselves.

There has been an urgent requirement and demand for refractory units that were lighter in weight and therefore thinner in section so that the ratio of refractories to finished product could be materially reduced. This has been accomplished in large measure by the cooperation of both technical and mechanical phases of the programs that have been worked out.

We in Ferro have seen the need for a further expansion and enlargement of operation. As a result, we have added to the personnel of our Engineering Departments and included in our plans a very much broadened research program.

From what has happened in the past

Continued on page 111

The New Labor Law: What It Is and What It Means to You

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

Quite recently, Congress enacted the Labor-Management Reform Act intending to correct abuses which have crept into labor and management, and to control and regulate union funds. I shall briefly explain the outstanding phases of this new law.

Section 101 of the law is formulated and designed especially to safeguard the interests of members of labor organizations. This section provides that every member of a labor organization shall have equal rights to nominate candidates for office in the organization, vote, attend meetings, and meet without objection or interference with other members, and also to freely express his opinions regarding the efficiency, past reputation, capabilities and the like of any candidate or business under discussion. *Of course, reasonable rules and regulations may be adopted by any labor union or organization and they must be adhered to specifically.*

Must Approve Increased Fees

This section also provides that the fees now payable by members of a local labor organization shall not be increased and no assessment shall be levied unless a majority of the good standing members by secret ballot or otherwise stated, approve the increase after a general or special meeting. Reasonable notice must be given the members of the contemplated meeting.

With respect to a federation of national or international labor organizations the same rules relatively are effective except that dues may be increased only by a majority vote of the delegates at a regular convention or at a special convention held after 30 day notices have been given to local or constitutent labor organizations. The dues, also, may be increased or an assessment levied by a majority vote of members of the executive board by authority of the Constitution and bylaws, but the increase is collectable only to the date of the next regular convention.

Right to File a Suit

With respect to the right of a union member to file a suit, or appear as a witness, the labor organization can-

Continued on page 102

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- Increases mark-up with rockfaced texture at negligible cost.
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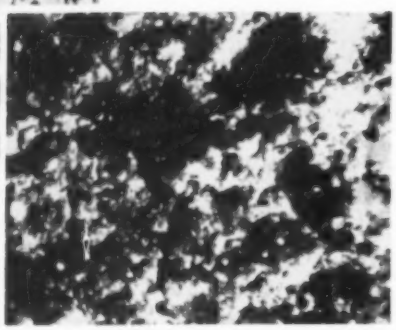

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BADLY CRAZED

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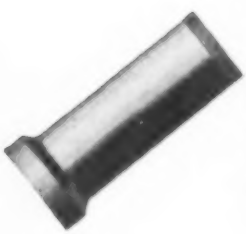
Improve your salt glaze, lower your costs—it's easy with RASORITE! This product is cheaper than either Borax or Boric Acid, yet it gives equally fine results. Use RASORITE to make your glazes more durable, more impervious to liquids, more uniformly free of crazing. Get the benefits of a borate-salt mixture—in lowered fuel costs, increased production and profits. Write today for details and technical data sheets.



MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

United States Borax & Chemical Corporation

50 Rockefeller Plaza, New York 20 630 Shatto Place, Los Angeles 5

Continued from page 101

not lawfully limit or restrict this right after such member has exhausted reasonable "hearing" proceeding not exceeding a four month delay. Furthermore, an employer must not directly or indirectly finance or otherwise participate in such suit, proceeding or petition, except as a party thereto.

As a protection against illegal expulsion of a member from a union's membership the law provides that no member who has paid his dues may be fined, suspended, expelled or otherwise disciplined by any officer of the union unless he is given a written notification and a reasonable period of time to prepare his defense. If there are any violations, the complaining member may file a suit in the United States District Court.

Section 104 of the law clearly provides that the secretary of the local labor organization must send to any requesting employe a copy of each collective bargaining agreement made with any employer. And, without any request, the secretary of all other labor organizations must send a copy of this agreement to each constituent unit having members affected by the agreement, and furthermore the secretary must keep available, at the office of the labor organization, copies of the agreement for inspection of any member or employe.

Duty to Report

Section 201 provides that every labor organization shall adopt a constitution and bylaws and shall file a copy with the Secretary, together with a report, signed by the president and secretary. This report must contain several clauses, in part, as follows: (1) the name of the labor organization, its mailing address, and any other address at which it maintains its principal office; (2) the name and title of each of its officers; (3) the initiation fee or fees required from a new or transferred member and fees for work permits required by the reporting labor organization; (4) the regular dues, fees or payments required to be paid by members; and (5) detailed statements explaining the various qualifications or restrictions on membership; levying of assessments, participation in insurance or other benefit plans; authorization for disbursement of funds

Continued on page 103

Continued from page 102

of the labor organization, audit of financial transactions of the labor organization; the calling of regular and special meetings; the selection of officers and stewards and of any representatives to other bodies composed of labor organizations' representatives, with explanations of the manner in which each officer was elected, appointed, or otherwise selected; discipline or removal of officers or agents for breaches of their trust; imposition of fines, suspensions, and expulsions of members, including the grounds for such action and any provision made for notice, hearing, judgment on the evidence, and appeal procedures, authorization for bargaining demands; ratification of contract terms; authorization for strikes, and issuance of work permits. Any change in information above required shall be reported to the Secretary at the time the reporting labor organization files with the Secretary the annual financial report.

Financial Report

Every labor organization shall file annually with the Secretary a financial report signed by its president and treasurer containing the following information of the assets and liabilities at the beginning and end of the fiscal year; receipts of any kind and the sources thereof; salary, allowances, and other disbursements to each officer and also to each employe who received more than $10,000.00 a year; direct and indirect loans made to any officer, employe, or member, which amounts to more than $250.00 during the year, with an explanation of the purpose and arrangements for repayment; direct and indirect loans to any business with a statement of the purpose, and arrangements for repayment; and other disbursements made including the purposes thereof.

Labor Law . . .

Every labor organization must furnish this information in a report to all of its members. *Also, every such labor organization and its officers may be sued to permit a member for just cause to examine any books, records, and accounts necessary to verify such report. A reasonable attorney's fee must be paid by the party being sued.*

Section 202 is complicated and provides, among other things, that every officer and employe of a labor organization shall file with the Secretary a signed report listing all stocks, bonds, securities and other interest which he or his wife or minor child received directly or indirectly through his employment. This Section explains that no officer or employee need report his bona fide personal investments.

Section 203 requires, among other things, that every employer must file a complete explanation of any and all agreements he made with employes regarding ordinary payments or loans of money or other thing of value, or any promise or agreement to any representative of a labor organization. These reports are intended to indicate whether or not the employer attempted to persuade employes to exercise or not to exercise the right to organize and bargain collectively through representatives of their own choosing, unless such payments were contemporaneously or

Continued on page 104

ELECTRIC SCREEN HEATING AT IT'S BEST!

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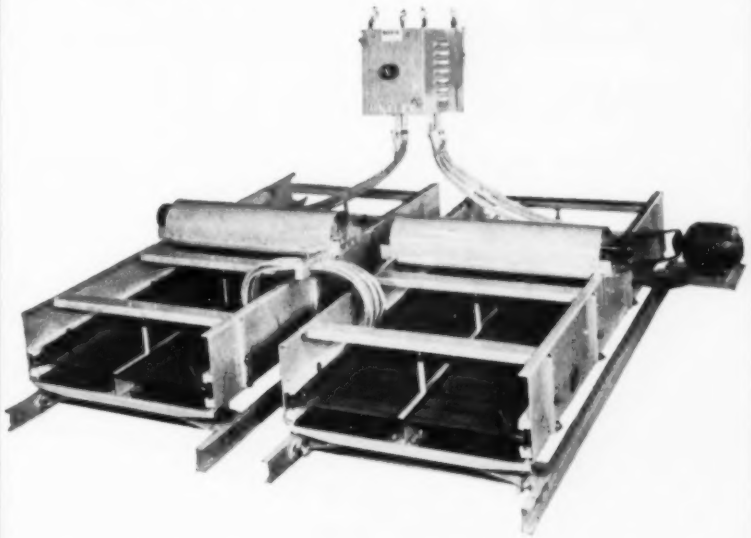


Shorter leads to eliminate current loss, split-secondary transformers for widest voltage range, cadmium-plated aluminum buss bars, assure you of highest efficiency and reliability.

THE SURPRISINGLY LOW COST, MADE POSSIBLE BY SIMPLICITY OF DESIGN, WILL INTEREST YOU. LET US SEND YOU SOME FACTS ABOUT UNILEC HEATED SCREENS TODAY!

UNIVERSAL VIBRATING SCREEN COMPANY

Racine, Wisconsin

Continued from page 103

previously disclosed to such other employes. This section provides further that no employer is required to file a report covering the services of any person agreeing to give advice to such employer or representing such employer before any court, administrative agency, or tribunal or arbitration or the like. Moreover, nothing in this Section 203 is intended to modify the rights protected by, section 8 (c) of the Nation Labor Relations Act, as amended.

Section 204 provides that no lawyer shall be required to divulge confidential information received from any client.

Section 205 merely provides that the contents of reports and documents pursuant to sections 201, 202, and 203 shall be public information, and the Secretary may make reasonable provision for the inspection and examination, on the request of any person, of the information and data contained in any report or other document filed with him pursuant to sections 201, 202, or 203.

Section 206 states that every person who is required to file reports shall maintain records for 5 years in sufficient detail to verify the documents.

Section 207 provides that each labor organization must ordinarily file the initial report required under various sections within ninety days after the end of its fiscal year.

Section 208 gives authority to the Secretary to issue, amend, and rescind rules and regulations prescribing the form and publication of reports, as he may find necessary to prevent the circumvention or evasion of such reporting requirements.

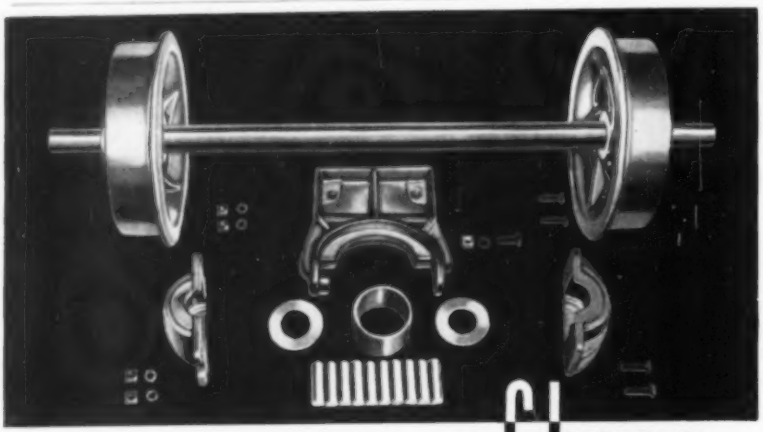
Penalties for Violation

Section 209 provides penalties for violation of the law, and stipulates that any person who willfully violates this law shall be fined not more than $10,000.00 or imprisoned for not more than one year, or both. The same penalty is provided for any person who makes a false statement or representation or entry of a material fact, knowing it to be false, or who knowingly fails to disclose a material fact, in any document, report, or other information, or who willfully conceals or destroys any required books.

Section 210 provides that whenever it shall appear that any person has violated the provisions of this law, the Secretary may bring a civil suit against the guilty person, and request an injunction.

Section 301 lists rules and regulations applicable to trustees, and in brief provides that every labor organization which has or assumes trusteeship over any subordinate labor organization shall file with the Secretary, within 30 days after the imposition of any such trusteeship, a report signed by its president and treasurer or corresponding principal officers, as well as by the trustees of such subordinate labor organization, containing the name and address of the subordinate organization; the date of establishing the trusteeship; a detailed statement of the reason or reasons for establishing or continuing the trusteeship; and the nature and extent of participation of the membership of the subordinate

Continued on page 107



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Dust-proof and oil-retaining, this well-known and proven bearing has kept equipment rolling smoothly through more than 80% of the brick plants in the United States. Make sure your kiln cars, dryer cars and transfer cars are properly equipped for years of trouble-free service. Specify Chase patented bearings.

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The Wellsville Fire Brick Co. has unlimited reserves available for production of high quality precision equipment to manufacture quality refractories to exact specifications.

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Dry press block is quick and easy to produce and control because it's blended in a Simpson Mix-Muller at less than 5% moisture and then pressed out in a die.

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A new booklet by Signode Steel Strapping Co. tells how you can increase your profits by packaging brick. It enables you to improve your operation while reducing costs.

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34 Stoody Co.
35 Ferro.
36 Harbison-Walker Refractories Co.
37 Bickerstaff, Inc.
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42 Williams Patent Crusher & Pulverizer Co.
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Page 124 American Clay Machinery
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Carrier spanner tile by Harbison-Walker Refractories Co. developed for the special requirements of the under-fired car top construction. The fact that it renders dependable service in kilns used for firing face and common brick and sewer pipe at temperatures up to 2200°F. is attributable to certain enhanced physical properties.

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Kiln car called S-D Floater by Sanford-Day were developed and proved in scores of kilns for trouble-free high temperature performance. Many sizes and styles are available.

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If you are considering the expansion of your present production facilities you may ask Harrop Ceramic Service Co.

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Complete size reduction from start to finished product is offered in a single Williams Hammer Mill available from Williams Patent Crusher & Pulverizer Co.

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Steel strapped brick reportedly saves builder time and money. This is a service of Acme Steel Strapping. An Acme representative has all the information on their services.

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Payloader by The Frank G. Hough Co. is faster—operates easier. Can unload railcars, load trucks and cars, feed mullers, crushers, Charge hoppers, bins, conveyors, build stockpiles.

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Continued from page 104

organization. The initial report shall also include a full and complete account of the financial condition of such subordinate organization at the time trusteeship was assumed over it. During the continuance of a trusteeship the labor organization which has assumed trusteeship over a subordinate labor organization must file an annual and financial report signed by the president of the organization which assumed the trusteeship.

Section 302 stipulates that trusteeships shall be established by a labor organization over a subordinate body only in accordance with the constitution and bylaws of the organization which has assumed trusteeship over the subordinate body, and for the purpose of correcting corruption or financial malpractice, or otherwise carrying out the legitimate objects of such labor organization.

Section 303 provides that with respect to a labor organization in trusteeship, it shall be unlawful to count the vote in any convention or election of officers, unless the delegates have been chosen by secret ballot in an election in which all the members in good standing of such subordinate body were eligible to participate. Also, no current receipts or money can be lawfully transferred, except in accordance with the Constitution and bylaws.

Action on Complaints

Section 304 provides that upon complaint of any member of a labor organization the Secretary shall investigate the complaint and if he finds probable cause to believe that a violation has occurred he can, without disclosing the identity of the complainant file a suit for appropriate relief. Considerable details of legal procedure are outlined in this section.

Section 305 merely provides that within three years from date of this law, the Secretary shall submit to the Congress a report upon the operation of this law.

Section 401 specifically provides procedures in election of officers in all national or international labor organizations, not including a federation of national or international labor organizations. This Section provides that the officers shall be elected not less often than once every five years either by secret ballot among the members in good standing or at a convention of delegates chosen by secret ballot. *This Section goes into great length of detailed legal procedure in such elections, secret ballots, selection of candidates, etc.*

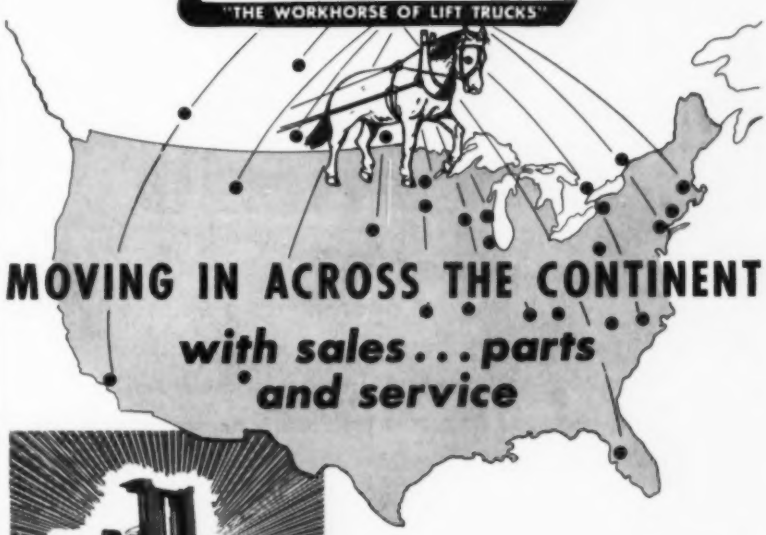
Section 402 gives relief to a member of a labor organization who has exhausted his remedies available under the constitution and bylaws of such organization, or who has not obtained a final decision within three calendar months after the invocation. Under such circumstances he may file a complaint with the Secretary within one month alleging the violation. This Section also goes into considerable detail as to the duty of the Secretary to make investigations, file suits, etc. etc.

Section 403 provides that no labor organization shall be required to conduct elections of officers with greater

Continued on page 108

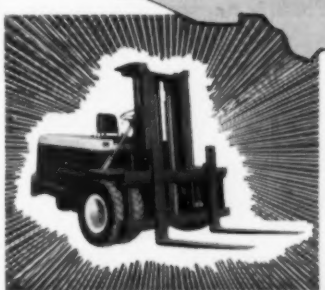
Erickson

"THE WORKHORSE OF LIFT TRUCKS"



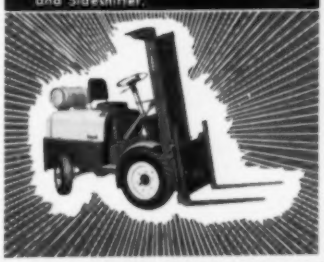
MOVING IN ACROSS THE CONTINENT

with sales . . . parts and service



Standard Model FK-80, 8,000 lbs. capacity at 24" load center.

Standard Model F-4W, 4,000 lbs. capacity at 24" load center, equipped with L-P Gas and Sideshifter.



Erickson is carefully building a sound, substantial dealer organization in North America. Only experienced dealers are being selected—who will have Erickson Fork and Platform Lift Trucks on display; who will carry parts and be equipped to render a complete repair and maintenance service to all industrial truck users.

The two Erickson Trucks shown here—Model FK-80 and Model F-4W—are designed for rough yard service. With large pneumatic tires and excellent balance, they are unexcelled for traction.

Erickson's unique design in sideshifters produces no lost load center. Erickson trucks with sideshifter retain their full rated capacity.

Write for catalog and name of your nearest Erickson sales-parts-service headquarters.

ERICKSON POWER LIFT TRUCKS, INC.

269 St. Anthony Blvd. N. E., Minneapolis 18, Minn.

Continued from page 107

frequency or in a different form than is required by its own constitution or bylaws, except as otherwise provided by this law.

Responsibilities of Officers

Section 501 was written into this law in contemplation of forestalling and preventing officers from doing things likely to prove detrimental to labor organizations. This Section provides that the officers, agents, shop stewards, and all other representatives of a labor organization have a position of trust in relation to such organization. It is, therefore, the duty of each such person to hold its money and property solely for the benefit of the organization and its members, and to manage, invest, and expend this money in strict accordance with organization's constitution and bylaws. Hence, officers must refrain from dealing with such organization as an adverse party, or in behalf of an adverse party in any matter connected with his duties. And he must not hold or acquire any pecuniary or personal interest which conflicts with the interests of such organization. Furthermore he must account to the organization for any profit he received in whatever capacity in connection with any and all transactions conducted by him or under his direction on behalf of the organization. This Section provides all this, and more.

For example, a suit may be filed against any officers, agent, shop steward, or representative of any labor organization who violated his duties. The law also provides that any person who embezzles, steals, or unlawfully converts to his own or another's use, any of the moneys, funds, securities, property, or other assets of a labor organization shall be fined not more than $10,000.00 or imprisoned for not more than five years, or both.

And again the law states that every officer, agent, shop steward, or other representative or employe of any labor organization who handles funds or money shall be bonded for the faithful discharge of his duties. This law specifies in detail the amount of required bonds.

Section 503 relates to loans. This Section provides that no labor organization shall make directly or indirectly any loan of more than $2,000.00 to any officer or employe of such organization. And, further, no labor organization or employer shall pay the fine of any officer or employe convicted of any willful violation of this law. Heavy penalties are provided for violations.

With a

LASSMAN HYDRAULIC DRY PRESS

. . . you are guaranteed a uniformity of particle distribution and density that vibration-compaction, impact or bumping, and independent top and bottom pressing WILL NOT produce.

We further guarantee to form your product true to dimension and shape and free of laminations whether in deep or shallow sections, plain, cored or with blind holes.

In addition to this guarantee of performance, the press itself carries a TWO YEAR guarantee against defective material and workmanship, a distinguishing mark of quality.

Production wise, with only one attendant, the fully automatic Lassman Hydraulic Dry Press will produce up to 4 pieces per minute of ware 18" deep pressed dimension using only a 25 horsepower motor. Shallower ware can be made up to 8 pieces per minute.

For unexcelled performance and product quality, specify Lassman

Quality EQUIPMENT for *Quality* PERFORMANCE

BENJAMIN LASSMAN & SON Route 8, GLENSHAW, PA.

Changes of Address

If you're due to change your address, be sure to avoid missing an issue of B&CR. Please notify us of your new address at least six weeks in advance of moving date. Write: BRICK & CLAY RECORD, 5 South Wabash Ave., Chicago 3, Ill. Be sure to give both old and new address, zone number, and your name.

ORGANIC BINDERS

GLUTRIN

(liquid)

or

GOULAC

(powder)

Especially suitable for increasing the molding and dry strength of

- **BRICK**
- **CLAY REFRACTORIES**
- **NON-CLAY REFRACTORIES**
- **SILICA REFRACTORIES**
- **REFRACTORY CEMENTS**
- **PLASTIC REFRACTORIES**
- **TERRA COTTA**
- **STRUCTURAL TILE**
- **SEWER PIPE**
- **SAGGERS**
- **FLUE LINING**

Small amounts required—easy to use. Economical and larger production of first quality product absorbs the investment many times.

Many successful users. We'll be glad to submit samples and our suggestion on procedures and amount needed.

Robeson Process Company

P.O. Box 960 ● Erie, Pa.

How this NEW insulation cuts heat loss up to 50% *thru masonry walls!*

Latest Authoritative Tests Prove High Insulating Efficiency of

ZONOLITE®

MASONRY FILL INSULATION

Exhaustive tests conducted independently by a leading university and by Structural Clay Products Research Foundation reveal that *Zonolite Water-Repellent Masonry Fill Insulation* satisfies 100% the three most important requirements of a masonry wall insulation:

New Zonolite Water-Repellent Masonry Fill Insulation pours freely from lightweight bags; fills 100% around wall ties, conduit, etc., won't settle, sag or ball up; retains initial efficiency for the life of the wall itself.

1 **Must not permit water to be transmitted across the cavity.**
2 **Must be able to support its own weight in the cavity without settling.**
3 **Must retain its insulating efficiency in actual field conditions.**

Actual building has shown, too, that *Zonolite Water-Repellent Masonry Fill Insulation* cuts masonry wall insulation costs over 60%...reduces heat transfer through walls as much as one-half...cuts air-conditioning costs as much as 25%. Send today for official reports substantiating these statements. No cost or obligation...just mail the coupon.

MAIL COUPON FOR LABORATORY TEST DATA

ZONOLITE COMPANY, Dept. BCR-10 135 S. La Salle St., Chicago 3, Ill.
Rush me complete information and test data on Zonolite Water-Repellent Masonry Fill Insulation.

Name_____

Company_____

Address_____

City & Zone_____ State_____

need SODIUM SILICATE?

PHILADELPHIA QUARTZ COMPANY

put your finger on a **LEADER**

Here you'll find the widest selection of silicate products; over thirty solutions ranging in $\%Na_2O$: $\%SiO_2$ from 1:3.75 to 1:1.60 and twenty-five powders and solids, $\%Na_2O$:$\%SiO_2$ from 1:3.22 to 2:1.0 . . . all quality controlled for consistently uniform performance.

Conveniently available coast to coast from plants located in Anderson, Ind.; Baltimore, Md.; Buffalo, N.Y.; Chester, Pa.; Jeffersonville, Ind.; Kansas City, Kan.; Rahway, N.J.; St. Louis, Mo.; Utica, Ill. and from associate companies: Philadelphia Quartz Company of California—Plants located in Berkeley and Los Angeles, Calif.; Tacoma, Wash. National Silicates Limited, with plants in Toronto and Valleyfield, Canada.

All these are yours and more . . . the benefit of PQ's century of experience in silicate manufacture and use.

When it's silicate service you need, get in touch with PQ.

PHILADELPHIA QUARTZ CO.

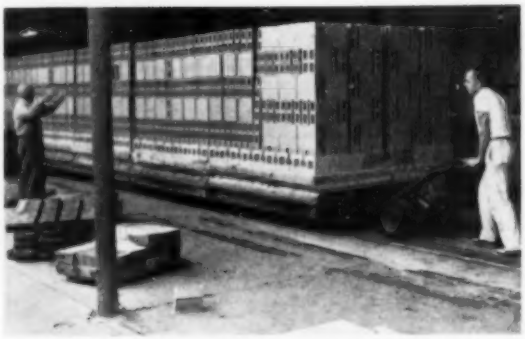
1148 Public Ledger Bldg., Philadelphia 6, Pa.

PQ SOLUBLE SILICATES

SODIUM SILICATES • POTASSIUM SILICATES • SODIUM METASILICATE
SODIUM SESQUISILICATE • SODIUM ORTHOSILICATE

DISTRIBUTORS IN OVER 65 CITIES

GRAVELY...



MOVES KILN CARS FAST, EFFICIENTLY, ECONOMICALLY!

The rugged 6.6 HP Gravely Tractor efficiently moves Kiln Cars weighing up to 100,000 pounds. Mr. W. S. Sells, Jr., Plant Superintendent of the Charleston Clay Products Co. states that their Gravely "consistently moves six loaded Kiln Cars, weighing approximately 10 tons each, with ease.

"The reverse as well as the forward speed makes spotting fast and efficient. The simple and positive clutch allows a degree of control not possible in any other equipment.

"We consider our Gravely Tractor an excellent investment, and would recommend it without reservation to any other manufacturer in this field."

SCOVE KILN PREPARATION

The Gravely Tractor, equipped with a Rotary Plow Attachment provides an excellent tool for preparing Scove Kilns. The hardest ground is no problem for the Rotary Plow, and the Safety Clutch prevents damage to the Plow Blades when they strike bits of old brick or other hard objects. Smaller objects are moved aside while larger ones stall the Tractor.

One man and a Gravely can prepare ground faster than 20 men can by hand.

6.6 hp—30 TOOLS

The powerful Gravely is a 6.6 HP Tractor with a Full Flow Lubrication System.

There is a choice of 30 different year-round tools and Attachments for every ground maintenance operation. These include Rotary, Reel and Gang Mowers plus **complete** snow removal equipment.

ALL-GEAR DRIVE

The Gravely is an all-enclosed, all-gear drive Tractor. There are no belts or chains to slip, break or wear out.

Two forward and REVERSE speeds assure ease of handling and maneuverability.

FREE DEMONSTRATION

For more detailed information, write for our colorful "Power vs. Drudgery" catalog or ask for a FREE DEMONSTRATION at your plant, UNDER YOUR OWN CONDITIONS! Write Today!

GRAVELY TRACTORS, INC.
P.O. Box 649-A
Dunbar, West Virginia

Continued from page 100

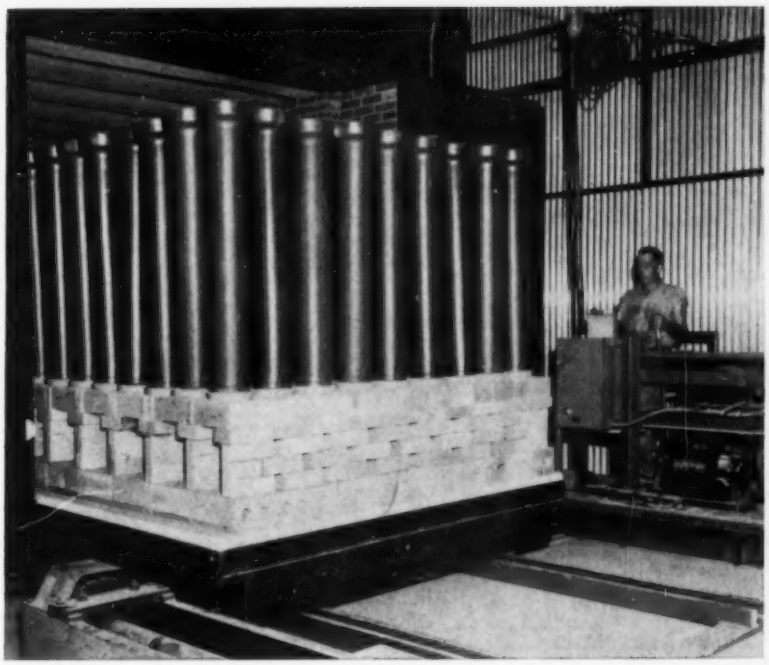
ten years, we are trying to foresee what will develop in a similar period in the future. It is our feeling that a continued improvement of products will be necessary, and this, in all probability, will lead to refractory materials in the high temperature range of firing. A complete new approach to materials will be necessary, and perhaps an entirely new mechanical approach to the production of such products.

Not only will it be necessary to reduce the unit weight of refractory items, but, structurally, they will have to be much stronger and their use life will have to be extended. In general, there will be the need for automated programs of production coupled with more intricate and accurate program of quality control and product analysis. It will also, in all probability, be a period involving a larger program of what we choose to call a "tailor-made program of products for the manufacturers that use such products." The demand for refractories, we anticipate, will be greater but there will be a greater stress on quality and a price that warrants usage. It is our belief that perhaps many of the products that we are making today will be completely outmoded within the next ten years.

We at Ferro are actively engaged in a program, based on practical experience and sound technology, to provide the new requirements of Industry. In the next decade we foresee new usage concepts, improved technical controls and better cost to product relationships all a part of the new look on the horizon.

Changes of Address

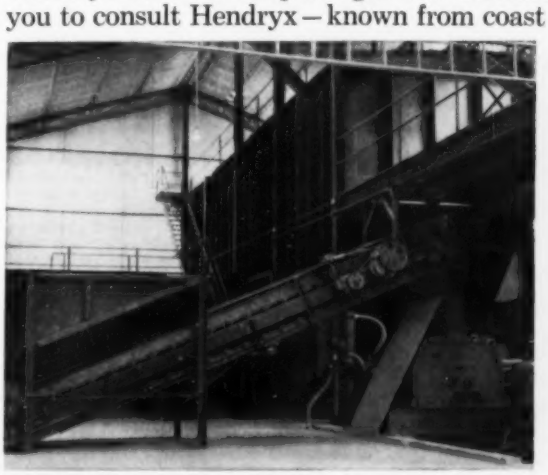
If you're due to change your address, be sure to avoid missing an issue of B&CR. Please notify us of your new address at least six weeks in advance of moving date. Write: BRICK & CLAY RECORD, 5 South Wabash Ave., Chicago 3, Ill. Be sure to give both old and new address, zone number, and your name.



Better ceramic plants are built by ceramic plant *specialists*

A "better ceramic plant" produces a quality clay product at a lower plant operating cost. Its kilns and dryers are tailor-fitted to a specific product and output, and operate with a minimum fuel input. Its up-to-date grinding and handling equipment is economic of both power and space. Its materials "flow line" has neither waste motion nor waste space. Its operation is economical of both man-power and man-energy, and reduces and simplifies maintenance.

This is the kind of ceramic plant Hendryx will build for you. When you are contemplating a new ceramic plant, it will pay you to consult Hendryx—known from coast to coast.



(top picture) Transfer car of burned, salt-glazed sewer pipe leaves the tunnel kiln, both Hendryx designed.

(left) Hendryx-designed clay grinding equipment and ground clay storage bins.

HENDRYX
CERAMIC PLANT DESIGN

DWIGHT B. HENDRYX AND ASSOCIATES
6621 Darlington Road
PITTSBURGH 17, PA.

Orton standard pyrometric Cones

Your assurance of more uniformly fired ware

The accepted standard for over 65 years

Orton Cones have been the Standard of industry for over 60 years, primarily because of their uniformity and reliability.

Plaques of Orton Cones, placed so they may be observed through the kiln peep holes, permit a visual check on the progress of firing during its latter stages. While pyrometric cones do not measure temperature, they may be used to indicate the end point of firing and thus provide an accurate measure of the maturity of the ware and the distribution of "heat work". There are Orton Cones for every application.

A 56-page booklet, "The Properties and Uses of Pyrometric Cones", and the Foundation's Temperature Equivalent Table are available upon request.

Foreign Sales: International Division, The Ferro Corporation, 4150 E. 56th St., Cleveland, O., or the Foundation

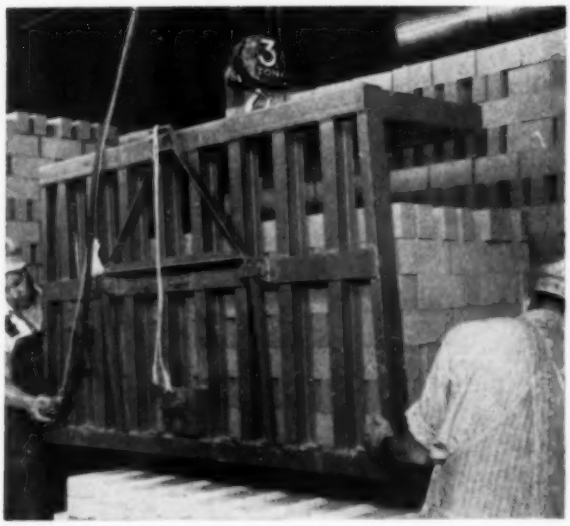
the firing insurance of thousands

The Edward **ORTON** Jr. Ceramic **FOUNDATION**

1445 Summit Street Columbus 1, Ohio

AXminster 9-8023

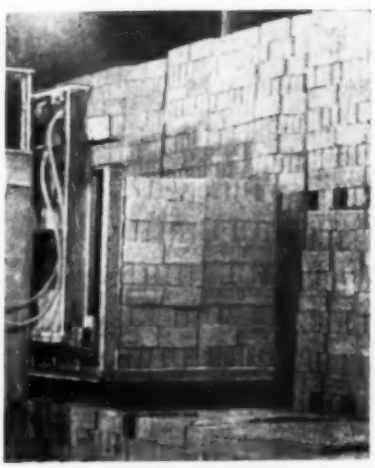
Make Brick Handling Easy...



PRIESTER Brick Forks

- Save Time
- Save Money
- Save Labor

Also Priester truck cranes for unloading from delivery trucks. Write for bulletin.



Brick in units of any size are handled by Priester Brick Forks. Automatic operation simplifies and speeds brick handling setting and drawing kilns, loading and unloading trucks and box cars.

Forks with flap grippers for cored and solid brick. Give service . . . take the hard work out of brick handling. Write today for more information.

BRADNEY MACHINE CO., INC.

Middletown, New York

Continued from page 94

machine. The paper connection is torn as the fork truck lifts the cube. The five hundred brick packages are then taken to storage or loaded on trucks for delivery.

Depending on the possibilities of the shipping department to coordinate kiln unloading, strapping and deliveries, the strapping operation can be conducted with from six to eight men. This compares to 13 required when the same number of brick were strapped in 500 brick cubes using the fixed jig box.

Package Tight, More Sturdy

The new package has several advantages over those produced formerly. They are tight, and consequently less apt to break on rehandling in storage and can be broken into 100 packs whenever required. This also allows the mason contractor to handle smaller units with hand trucks if he so desires.

The Richards brothers, Bob, Bill and Jack, operators of the plant, point out that packaged handling in the plant can eliminate to a great extent the heavy surge periods with which a loading crew is confronted in loose handling. In fact, it has become standard operating procedure at Owensboro for the fork truck drivers to set loads ready for delivery out in segragated areas. The Superlite equipped trucks can then be self-loaded at night or on weekends by the driver and the trucks kept in operation. During normal working hours the trucks are loaded with fork trucks as this is faster.

Better utilization of trucks, both plant owned and contractors allow better service to customers during periods of peak demand. This is counted as a plus helping to offset the cost of steel strap and paper in the operation. It is estimated that each 100 pack requires 10c worth of steel and 2c worth of paper. As the material handling takes place at the same time as culling and color grading, it is felt by the managers that part of the strapping labor would be incurred in any event and that only a fraction of the five man loading crew can be properly charged to the cost of strap production.

80% Strapped

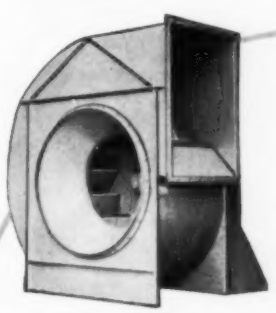
After several years of offering strapped brick to the market, Owensboro finds that some 80% of all shipments are strapped.

ROBBY SAYS:

Look to
ROBINSON
for Smooth Handling of Air

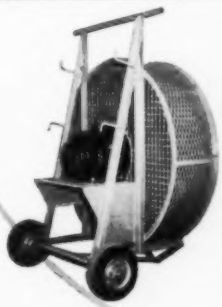
IN KILNS—DRYERS—SINTERING BELTS

Robinson air handling equipment for the ceramic industry is custom-engineered to meet the specific requirements designed into your tunnel kilns, periodic kilns, sintering belts, or product dryers. Long experience in improving air handling techniques gives Robinson engineers quick understanding of your problem, plus the know-how for solving it. Every Robinson solution has 3 ingredients: (1) efficient air handling, (2) low power consumption, and (3) extended mechanical life.

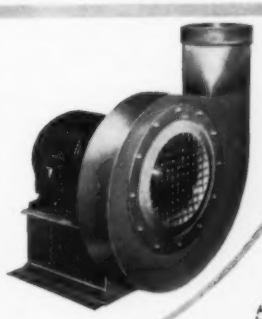


Type J Fan
600 to 450,000 cfm
Bulletin 2500

Type AE Exhauster
400 to 90,000 cfm
Bulletin 5100



Sulky Type
Man Cooling Fan
Bulletin 8001



Type CS
Pressure Blower
Bulletin 1100

Why not take a tip from Robby—look to Robinson for smooth handling of air—the result of expert engineering cooperation. Write today.

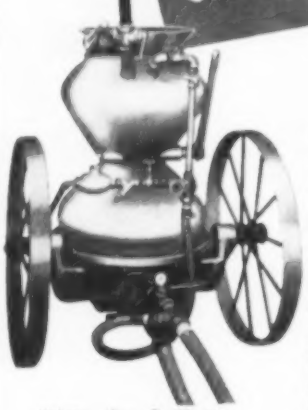
SUSTAINING ASSOCIATE SCPI

Member of AMCA

INDUSTRIAL FANS • BLOWERS • EXHAUSTERS
ROBINSON VENTILATING CO.
119 HENDERSON STREET, ZELIENOPLE, PA.

Save! ON FURNACE REPAIR and REFRACTORY INSTALLATION

THE "CEMENT GUN"® METHOD

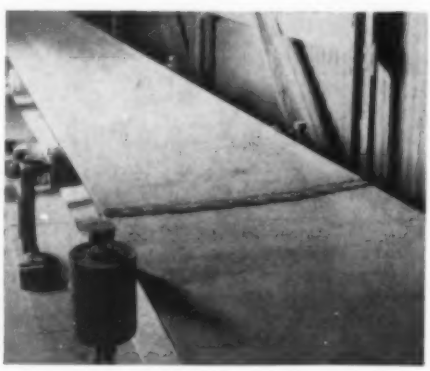


The CEMENT GUN is simple to operate; two or three of your own men can learn quickly and easily, after which they can make all your refractories repairs. With the CEMENT GUN they can place a lining 1" to 6" thick in one continuous operation. They can make patches in a "hot" furnace. They can place up to 5 thousand pounds of refractory material an hour. The CEMENT GUN method saves down time, saves material and extends the life of your present linings. Write today for further information.

Write for Bulletin No. 3000-B Today!

CEMENT GUN COMPANY
Gunite® Contractors
1520 Walnut Street • Allentown, Pennsylvania

TOPS . . . functioning like new after 18 MONTHS AT 300 TONS PER HOUR!



Service as outstanding as this is the rule instead of the exception when CRESCENT Belt Fasteners are used. Furthermore, the faithful acceptance of CRESCENT Belt Fasteners over the years demonstrates conclusively that our original design for joining and repairing belting of any length, width and thickness is still tops in performance.

Solving tough problems in joining virtually any kind of belting has become an everyday occurrence with us. In brief, CRESCENT Belt Fasteners provide the fastest, most durable and most economical method of joining and repairing conveyor, elevator and transmission belting. Also, CRESCENT Rivets are self-piercing and self-clinching, thus no holes to align and bore. A hammer is the only tool required to execute any job.

A trial installation will verify the acknowledged fact that CRESCENT Belt Fasteners make belting give better service. Remember . . . our vast experience accumulated since 1897 is at your disposal without obligation. Get complete information today!

CRESCENT BELT FASTENER COMPANY
381 FOURTH AVENUE, NEW YORK 16, NEW YORK
65 Market Street, Toronto 1, Ontario, Canada 32 Paradise Street, Birmingham 1, England
DISTRIBUTORS THROUGHOUT THE WORLD

MORE INDUSTRY NEWS

Standard Slag Buys Cleveland Builders Company

The Standard Slag Co. of Youngstown, Ohio recently purchased a controlling interest in the Cleveland Builders Supply Co., one of Cleveland's oldest building supply firms.

New officers of the Company are A. W. Wood, President; J. C. Ehle, V. P. and G. M.; Guthrie Bicknell, Secretary-Treasurer; E. M. Harper, Vice President and General Sales Manager and A. A. Bonnema, V. P. —Marketing.

John D. Kling, former President, remains on the Board, as does Thomas A. Burke. Messrs. Wood, Ehle, Harper and Bicknell are the other members composing the Board.

The founders and principal officers of The Standard Slag Company are L. A. Beeghly, President and W. E. Bliss, V. P.

The Standard Slag also owns the Goff-Kirby Co. another Cleveland building materials firm, which will specialize in dealer sales and stevedoring.

The Cleveland Builders Supply Co. has been for many years Sales Agent for the Cleveland Slag Company, a division of Standard Slag Company, in disposing of its large production of blast furnace slag, amounting to as much as 5,000 tons daily.

Cleveland Builders aims to develop some new products from its two brick plants and hopes for new sales in the pre-stressed concrete.

Gordon O. Watson, formerly Assistant Director of Marketing for Carborundum's Midwestern Sales District, has been promoted to Assistant Director of Marketing for the Company, according to an announcement by Mr. Frederick T. Keeler, Director of Marketing for The Carborundum Company, Niagara Falls, New York.

Meeting at Lafayette

On Oct. 6, 7, and 8, 1960, the Ninth National Clay Conference will be held at Purdue University, Lafayette, Ind. under the auspices of the Clay Minerals Committee of the National Academy of Sciences-National Research Council.

- **Fluorspar**
- **Magnetite**
- **Chromite**
- **Manganese**

We have recently built a completely modern plant in Brownsville, Texas, to process minerals for the brick trade to size and high chemical specifications. Custom grinding facilities are available.

This plant means more efficient service and, as a shipping point for other NP & M products, quicker delivery for our customers in the West and Southwest. It represents another step in our expansion program designed to meet the increasing demand for our wider range of products. Those listed here are all immediately available and will be milled to your requirements.

Our consistent growth over the past 65 years is a measure of the personal service you may expect from us as well as the quality of our products.

NATIONAL "ALWAYS UNIFORM" ESTABLISHED 1904

CONTRIBUTING ASSOCIATE SCPI

NATIONAL PAINT & MANGANESE COMPANY

A division of Howe Sound Co., Inc.

Lynchburg, Virginia

Many REFRACTORY PLANTS Use EAGLE CRUSHERS for Reclaiming Unburned Culls and Rejects!

THEY have found Eagle Double-Roll Clay Crushers most efficient and economical for salvaging rejected bricks and shapes from the dies and presses. Rejects are quickly crushed so that material is easier to re-pug or transport back for re-grinding.

The Eagle Standard Crusher shown is handling green brick rejects at Harbison-Walker Refractories, Clearfield, Pa. plant—one of the many Eagles installed at their plants. For raw clay or rejected bricks and shapes you can't beat Eagle Crushers.

THE EAGLE LINE

GRINDERS

CLAY CRUSHERS

SHALE PLANERS

Get the Inside Facts— Send for Bulletin 952.

SINCE 1872

EIW EAGLE IRON WORKS

EXPERIENCE, PROGRESS, SERVICE SINCE 1872

EAGLE IRON WORKS

131 HOLCOMB AVE., DES MOINES, IOWA

4 BIG REASONS *serve industry best*

Hanco ELECTRIC SCREEN HEATERS

❶ ELIMINATE BLINDING

❷ INCREASE TONNAGE

❸ BUILD GREATER PROFITS

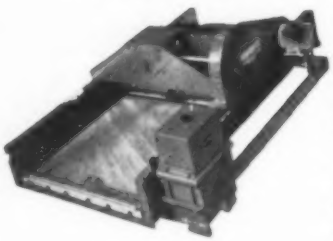
❹ SPEED PRODUCTION

PIONEERS IN ELECTRIC SCREEN HEATING

F. R. HANNON & SONS Hanco

1605 Waynesburg Rd. S.E., Canton 7, Ohio

Look at a Leahy® Screen— You Can See the Difference



Even an inexperienced person can tell that the Leahy Screen is as clean as a hound's tooth in design and operating convenience.

The Leahy Screen is not cluttered up with bothersome flexible connectors. Electric current for the heating, between the transformer and the jacket, is carried through multiple bus bars beneath the screen—out of the way and out of mind. There are no special electrical connections to break and remake even when jackets are changed.

The economies are obvious . . . power is saved with more efficient circuiting, time is saved in jacket changing, and maintenance cost is greatly reduced, particularly with the elimination of flexible connectors.

THE Leahy NO-BLIND VIBRATING SCREEN

— offers —
INTEGRATED HEAT SCREENING

Send for full information. Ask for Bulletin 16-EH.

THE DEISTER CONCENTRATOR CO., INC.
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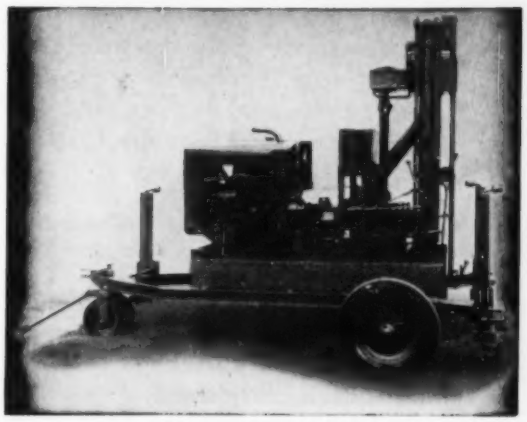

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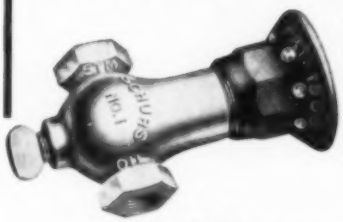

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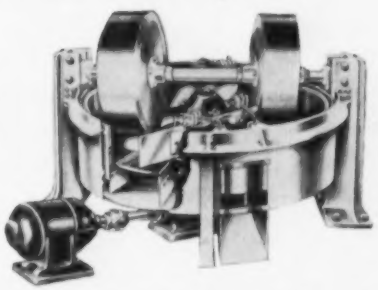
Clearfield's New Model 900 Dry Pan

The new high-efficiency Model 900 Dry Pan by CLEARFIELD assures lower production cost and easier maintenance with its totally-enclosed direct motor drive. The new model comes in 8½ or 9-foot diameters. Vibration is reduced, less power needed, and maximum crushing area is covered per revolution. All parts durably constructed for long-life service with minimum maintenance.

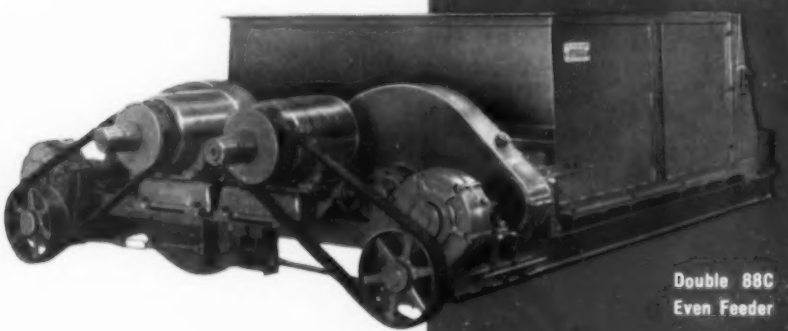


FERNHOLTZ MACHINERY CO., 8468 MELROSE PLACE, LOS ANGELES 46, CALIFORNIA

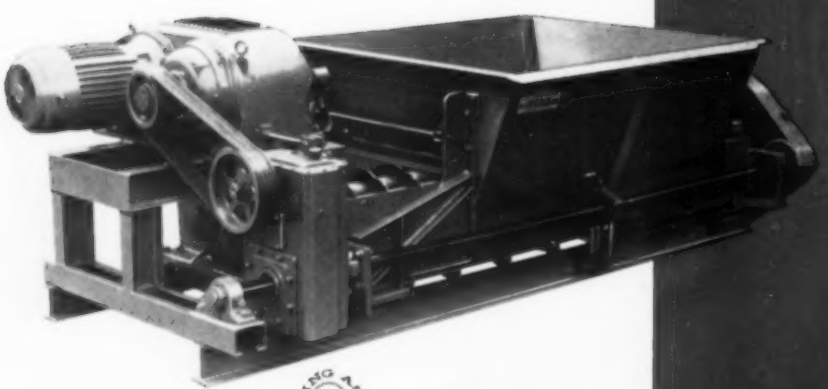
Steele Even Feeders can be designed to handle any type clay. Sides can be sloped outward for maximum capacity, straight up to reduce bridging, or sloped slightly inward for extremely difficult or sticky clays. Hopper sizes can be varied to suit individual needs. Gates can be adjusted upward or downward to allow adjustment of clay feed without changing the speed of the spiral shafts, or variable speed drives can be furnished to control shaft speeds. Two, four, or eight spiral shafts provide a positive force which insures a constant and uniform flow of materials at all times.

For any material . . . or for any production requirement, Steele will furnish you with an Even Clay Feeder to meet your exact needs. Write for full information.

Steele Even Feeders give you Accurately Controlled Feed on any Type Clay



Double 88C Even Feeder



No. 88C Even Feeder

SUSTAINING ASSOCIATE SCPI

J. C. Steele & SONS, INC., Statesville, N. C.

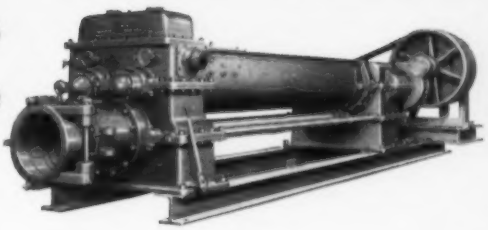
Pacific Agents: Walter C. Stoll, [illegible] Alhambra Ave., Los Angeles 32, Calif.

THE BEST IN CLAY MACHINERY SINCE 1889

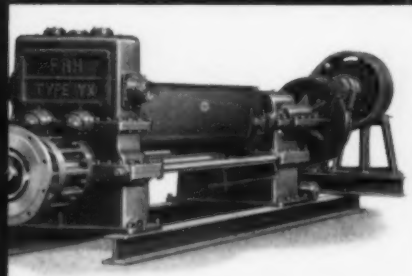
Ceramic F-R-H Machines

Finest in the world
Since 1888

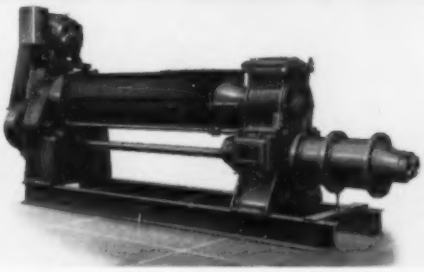
Whatever your needs
Check the F-R-H Line



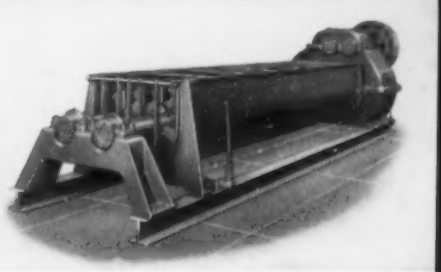
DE-AIRING BRICK AND TILE MACHINES
Six sizes using from 30 to 300 hp. with optional four-speed transmission drive. There is a size to fit any production requirement.



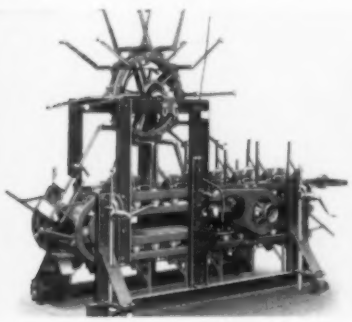
SEWER PIPE MACHINES-HORIZONTAL: Engineered especially for the stop-start requirements of sewer pipe extrusion plus the extra flexibility of four-speed transmission drive.



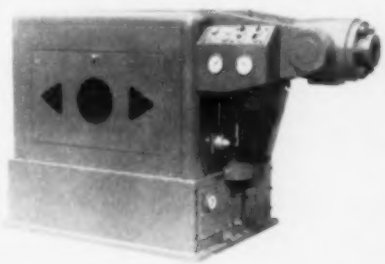
DE-AIRING POTTERY MACHINES: Both horizontal and vertical, with choice of 12 sizes, 25 models to meet your exact requirements.



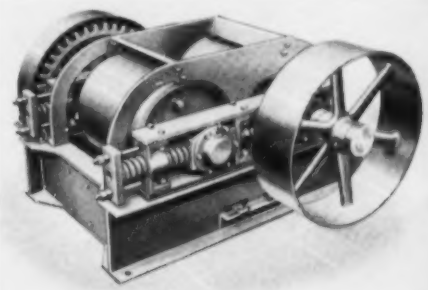
DOUBLE SHAFT PUG MILLS: For tempering of materials, with double pugging, the F-R-H Pug Mill offers superior features in both engineering and construction.



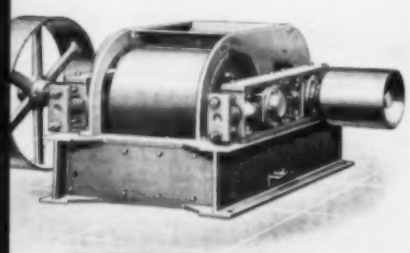
AUTOMATIC CUTTERS: Automatic brick and tile cutters in all sizes, continuous cutting without waste. Hand cutters available to meet special requirements.



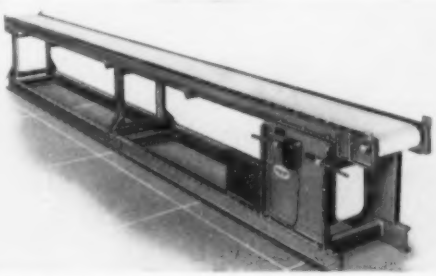
HYDRAULIC PRESSES: Hydraulic presses available in both horizontal and vertical models. Die pressure for extremely stiff extrusion up to 8,500 P.S.I.



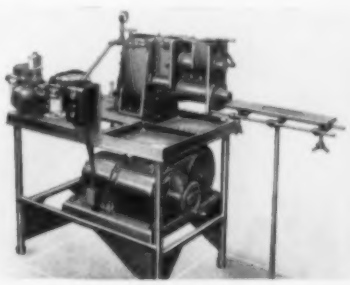
CRUSHER-SMOOTH ROLL: Heavy-duty, high capacity crusher with renewable, shell-type rolls. Capacity 20 to 40 tons per hour using 25 to 40 hp. motor.



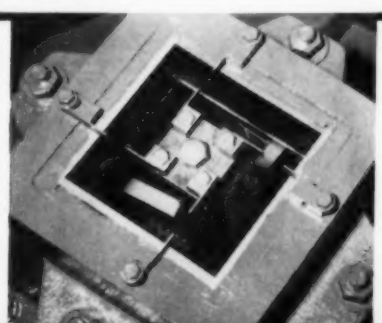
DISINTEGRATOR: Heavy-duty, high capacity disintegrator of welded steel construction, renewable rolls. Tool steel cutting knives on high speed roll.



DELIVERY BELTS: Engineered to your exact requirements in 10" to 14" widths, lengths to suit. Off bearing or feed belts designed to solve your handling problems.



LABORATORY MACHINES: Experimental and quality control machines in suitable sizes and models. Used by all leading Ceramic Colleges.



DIE ENGINEERING:
Complete die engineering and production facilities for any die requirements. Licensed Ni-Hard producers in our own foundry.

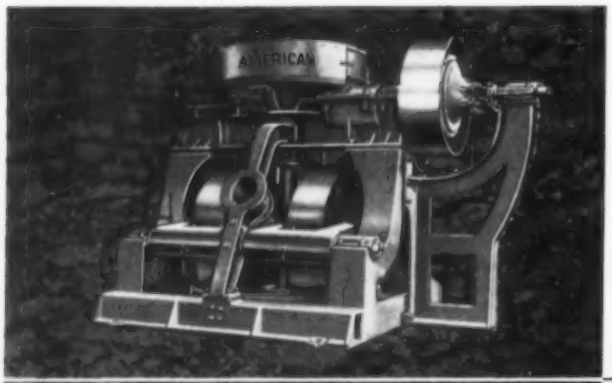
The Fate-Root-Heath Company

CERAMIC MACHINERY DIVISION

Dept. B-1 Plymouth, Ohio, U.S.A.

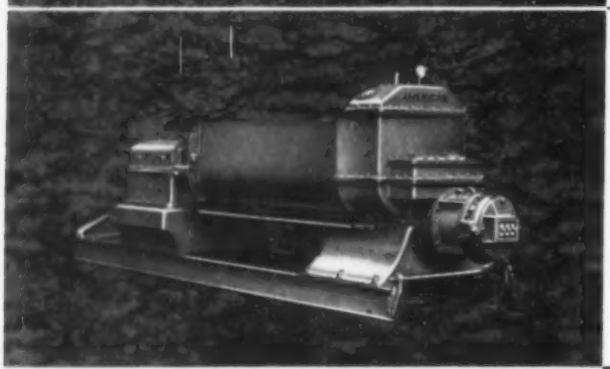
Service - anytime, anywhere, on any F-R-H Ceramic Machine ever built.

MAKE *American* THE START OF AutoCLAYmation PLANNING



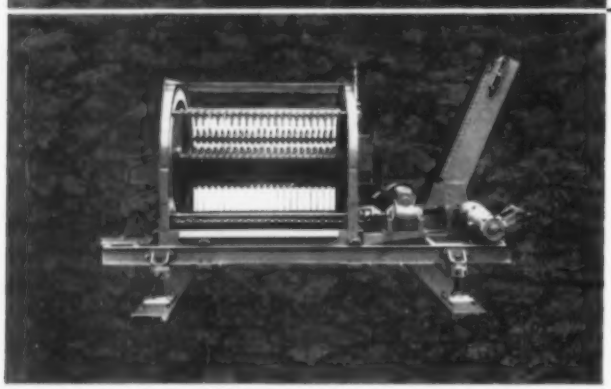
AMERICAN GRINDERS

Designed for volume clay production . . . eight models range from 15 to 80 tons per hour capacity. Materials can be handled wet or dry . . . no screen plates to clog or slow down production. Low initial investment . . . requires only a minimum of floor space . . . low power consumption . . . needs only a minimum of maintenance.



AMERICAN DE-AIRING COMBINED MACHINES

Machine handles building, fire or paving brick, also hollow block and drain tile. Capacity range is from 3,000 to 18,000 building brick per hour or 10 to 40 tons of hollow ware per hour. This capacity is governed by the clay used, size and kind of ware manufactured and by the operating speed.



AMERICAN AUTOMATIC ELECTRIC CUTTERS

Hourly capacity is 3,000 to 18,000 bricks . . . 23 standard bricks per cut. Every motion is electrically controlled to give precision accuracy of any brick or tile cut up to 14"x14". The cutter is a complete unit, there are no extras needed. Hinged measuring frame can be lifted to give necessary room to change die or front.

AutoCLAYmation stands for more efficient means and methods in the production of clay production. "American" clay machines fit into AutoCLAYmation planning because they are designed for volume clay production . . . production that will spell profit for your operation. "American" specialists have the experience to design and outfit a complete plant from pit to kiln, or solve any phase of a brick or tile production problem. Write or call for complete information.

American CLAY MACHINERY

A Division of HUBER-WARCO COMPANY
Marion, Ohio, U.S.A.

Plants in Marion and Bucyrus, Ohio
Cable Address: HUBARCO

OVER A CENTURY OF EXPERIENCE IN THE MANUFACTURE OF CLAY MACHINERY